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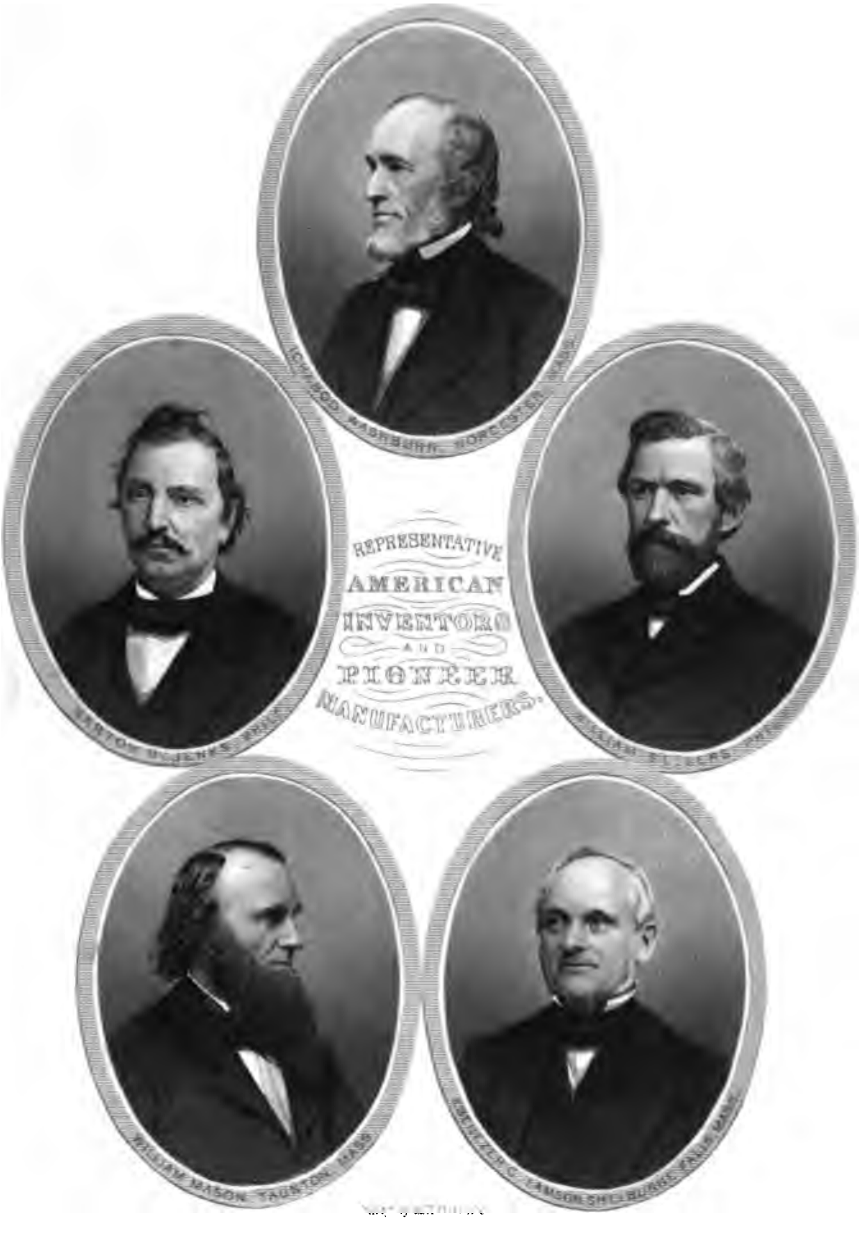
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REPRESENTATIVE
AMERICAN
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A HISTORY

OF

American Manufactures

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1608 TO 1860:

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THE ORIGIN AND GROWTH OF THE PRINCIPAL MECHANIC ARTS AND
MANUFACTURES, FROM THE EARLIEST COLONIAL PERIOD
TO THE ADOPTION OF THE CONSTITUTION;

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MANUFACTURES AND USEFUL ARTS,

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1790

The President's first Annual Message to Congress, at its second session in the following year, was delivered in a full suit of broadcloth, ordered at the woolen factory of Colonel Wadsworth, at New Haven, Connecticut. The Message, among other objects recommended, says, "That of providing for the common defence will merit particular regard. To be prepared for war is one of the most effectual means of preserving peace." It continues, "a free people ought not only to be armed, but disciplined; to which end, a uniform and well-digested plan is requisite: and their safety and interest require that they should promote such manufactures, as tend to render them independent of others for essential, particularly for military supplies.

"The advancement of Agriculture, Commerce, and Manufactures, by all proper means, will not, I trust, need recommendation. But I cannot forbear intimating to you the expediency of giving effectual encouragement, as well to the introduction of new and useful inventions from abroad, as to the exertions of skill and genius in producing them at home, and of facilitating the intercourse between the distant parts of our country, by a due attention to the post office and post roads.

"Nor am I less persuaded, that you will agree with me in opinion that there is nothing which can better deserve your patronage than the promotion of science and literature. Knowledge is in every country the surest basis of public happiness."

Acting upon these enlightened suggestions, Congress ordered "that it be referred to the Secretary of the Treasury to prepare and report to this House, a proper plan or plans, conformably to the recommendation of the President in his speech to both Houses of Congress, for the encouragement and promoting of such manufactories as will tend to render the United States independent of other nations, for essential, particularly for military supplies." The report was made toward the end of the ensuing year.

In conformity with another resolution of the previous session the Secretary reported to Congress a plan for the support of the national credit, by a faithful discharge of the principal and interest of the public debt, estimated in the aggregate at $79,124,464. The result was an Act providing for the prompt and regular payment of the interest and overdue instalments of the foreign debt and its final liquidation; for the assumption by the General Government of the several State debts, and the conversion of the whole domestic debt into a voluntary loan, subscriptions to which were payable in certificates of such debt at par value, and in continental bills of credit at one hundred for one—the duties on tonnage and imports under new acts, and the faith of the Government, being pledged for the interest.

To provide additional revenue for these objects, the tariff underwent a revision, whereby the duties the House proposed to levy were in the Senate, with a few exceptions, augmented twenty-five, fifty, and in some cases one hundred per cent. above the former rates. The free list was somewhat extended, and an increase of ten per cent. on goods imported in foreign vessels, substituted for the discount previously allowed to that amount on importations made in American ships. The Tonnage Act was remodelled, but without any change in the rates of duty or further discrimination between foreign vessels.

The obvious justice to the public creditors, of the Funding Act, and its advantages, so ably set forth by Mr. Hamilton, soon became apparent. A new impulse was given to industry, and confidence in the stability of the Union was evinced by an immediate rise in the current value of the continental certificates, which had already advanced since the passage of the first revenue bill. A rapid augmentation of the tonnage of the United States, which followed, has been ascribed by many to the discriminating duties on tonnage and imports made in the acts above referred to.

As required by the Constitution of the United States, which was first to ordain the systematic enumeration at regular intervals of the population, as a basis of representation and taxation, Congress passed its first act for a census of the inhabitants of the whole Union. The schedules prepared under this law did not embrace any account of the occupations, wealth, or industry of the people, which have since become universally regarded as an equally important index of the progress and prosperity of nations. The population on the first of August, was found to be 3,921,326, including 697,697 slaves, and exclusive of Indians not taxed.

By virtue of the eighth section of the first article of the Constitution, three other laws, having important relations to the progress of industry and knowledge, were enacted by Congress. One established a uniform rule of naturalization.

Another, designed to promote the progress of useful arts, secured to citizens of the United States, the inventors of new machines or processes, or improvements upon old ones, the right to enjoy under letters patent, to be issued by a Board, consisting of the Secretaries of State and War, and the Attorney General, the sole and exclusive use of their inventions, for a period of fourteen years. The first patent under this law was issued by the Secretary of State on the 31st July, and two others during the year.

An act for the encouragement of learning by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, authorized like the foregoing by the Constitution, and recommended to the especial attention and encouragement of Congress in the presidential speech, granted to authors, citizens, or residents of the United States, the copyright of their works for fourteen years, with the privilege, at the end of that time, of renewing it for a like term.

A memorial to Congress in March, from the manufacturers of snuff, and other manufactured tobacco in Philadelphia, deprecating a proposed tax upon those articles, represents that since the commencement of the Revolution, the importation of snuff and prepared tobacco had almost entirely ceased. There were in the city of Philadelphia, at least thirty manufactories, in which not less than three hundred men and boys were employed. Nearly every inland town in the state contained one or more factories. Snuff mills, recently invented in the city, and driven by water, were in use. Steam was soon after employed. At Albany, New York, was a very complete set of mills for manufacturing tobacco, snuff, mustard, etc., recently erected by Mr. James Caldwell, an enterprising merchant of the city. They were regarded as the most extensive and perfect of the kind in the country. The snuff mill was considered capable of making, in nine months of the year, sufficient snuff for the whole northern part of America. The works, which were destroyed by fire in 1794, at a loss of £13,000, and immediately rebuilt, contained patent machinery of Mr. Caldwell's designing.[1]

March 16th.—The Manufacturing Society of New York city was incorporated.

In April, William Almy, Smith Brown, and Samuel Slater of Providence, Rhode Island, entered into articles of copartnership, under the name of Almy, Brown & Slater, to carry on the spinning of cotton by water power, in which the last mentioned was to bear one half the expense, and be entitled to one half the profits.

(1) The manufacture of snuff and of tobacco for chewing and smoking, was quite extensively carried on in several States, having been early introduced. Tobacco was grown in New Netherlands by the Dutch, from nearly the first settlement, and sold there, in 1646, at forty cents a pound. The extensive and widely known house of Lorillard, is probably the oldest now in America, Pierre Lorillard having commenced the manufacture in 1760. By his widow, and subsequently by his sons, it has been continued to the present time. Gilbert Stuart, the father of the celebrated painter, emigrated from Scotland to Kingston, R. I., (where the artist was born, in 1756), for the purpose of engaging in the snuff manufacture. He was not successful, however, and during the Revolution found shelter for his loyalty in Nova Scotia. A snuff-mill was started in East Hartford, Conn., in 1784, by Wm. Pitkin. Tobacco farms were not uncommon in the neighborhood of Philadelphia in 1790, and Connecticut has long raised excellent tobacco. A duty of six cents a pound, intended to be prohibitory, was laid on manufactured tobacco by the first tariff, and ten cents a pound on snuff this year, 1790. From August, 1789, to September 30th, 1790, 15,350 pounds of snuff were exported.

It was ascertained that the number of gunpowder works in Pennsylvania was twenty-one, in which were annually made 625 tons of powder. Four others were in course of erection. A company was formed in Baltimore, to erect an extensive gunpowder factory in that city. It was built the next year on Gwinn's Falls, and was in operation until September, 1812, when it blew up, and was never rebuilt.[1]

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(1) Annals of Baltimore.—The earliest reference to the manufacture of gunpowder in this country, is found in an order of the General Court of Massachusetts; of June 6, 1639, when Edward Rawson was granted 500 acres of land at Pecoit, "so as he goes on with the powder, if the saltpeter comes." In June, 1642, to promote the public safety, "by raising and producing such materials amongst us as will perfect the making of gunpowder, the instrumental meanes that all nations lay hould on for their preservation, &c., do order that every plantation within this Colony shall erect a house in length about 20 or 30 foote, and twenty foote wide within one half year next coming, &c., to make saltpetre from urine of men, beasts, goates, henns, hogs, and horses' dung, &c." *Records*, i. 263; ii. 17. This injunction to preserve organic matters for the formation of nitre beds, was conformable to the practice required of the citizens of London and Westminster, by royal proclamation in 1626, and with that of Sweden, in the present day, where every peasant is required by law to have his compost shed or *nitriary*, and to furnish the State a certain quantity of saltpetre, yearly. It was enforced by subsequent orders, and by considerable fines. In May, 1666, Richard Wooddey and Henry Russell, of Boston, having made preparations for saltpetre and powder works, were granted certain privileges by way of encouragement. A powder mill was built at Dorchester, previous to 1680. A law of the General Court, enacted previous to 1704, prohibited the exportation of gunpowder, and authorized "the undertakers of the powder mill," to impress workmen by a warrant from the magistrate, as in the case of a public work. The numerous French and Indian wars, and the nature of colonial life and trade, created a vast demand in England for gunpowder for America. During Frontenac's expedition, in 1696, it sold for a pistole the pound. In 1761, the London Society of Arts, to stimulate its production, offered a premium for nitre imported from America. Four years after, expectation was a good deal raised in England, by news that a "sulphur mine" had been discovered near Albany, and some powder manufactories, it was said, were about to be erected in the province. A mill at Rhinebeck, in September, 1775, supplied powder at £20 per cwt. We have met with no account of more than one powder mill built before the Revolution, which found the Colonies quite unprovided with this "instrumental meanes." As the exportation of powder and its materials from England, was prohibited by an order in Council, of October 19, 1774, the utmost encouragement was given to their manufacture by the Continental Congress and the several State Conventions, assemblies, and Committees of Safety. A resolution of the Provincial Congress of Massachusetts, December 8, 1774, states, that the ruins of several powder mills existed there, and many persons understood the business. It recommended the restoration of one or more of the mills, or the erection of others. Hence, the manufacture of powder appears to have been attempted, at least in that Colony, previous to the erection, in 1775, of a powder mill at East Hartford, Connecticut, which has since been spoken of as the first in this country. This was built by William and George Pitkin, under an Act of the Assembly regulating their erection, and giving a bounty of £30 each for the first two powder mills erected, and £10 for every cwt. of saltpetre made during the next year. Liberty was at the same time given to Jedediah Elderkin and Nathaniel Wales, to set up a powder mill at Windham.

About the same time a powder mill was erected at much expense at South Andover, Considerable quantities of Epsom Salts were manufactured in the town of Bridport, Addison County, Vermont, from mineral springs, which were found, by the Rev. Sylvanus Chapin, to be strongly impregnated with sulphate of magnesia. In the clay soil of a well in the same county similar springs exist, from which those salts have been made.

Massachusetts, by Hon. Samuel Phillips, who the same year founded the Academy at Andover, which bears the name, and has repeatedly received the benefactions of the family. This mill, and another at Stoughton, supplied large quantities of powder to the army. The former blew up in 1778, and the proprietor, ten years after, erected a paper mill at the place, conducted by Phillips and Hughes. One or more powder mills were built in Pennsylvania, before that of Col. Pitkins. The committee of the City and Liberties, in 1775, established a large saltpetre works on Market street, Philadelphia, under the superintendance of Messrs. Biddle, Clymer, Allen, Mease, L. Cadwallader and Dr. Rush, to which the local committees were requested to send persons to be instructed. Congress, the same year, published a manual giving several methods of making saltpetre, in which experiments were made by Thomas Payne and Captain Pryor. Saltpetre works were set up in Boston, by Dr. Whitaker, and by others, in different places. The Council of Safety caused the erection of several saltpetre and gunpowder factories in Pennsylvania, including the Continental Powder Mill, at French Creek, which exploded in March, 1777. They allowed $8 per cwt. for gunpowder.—*Pennsylvania Archives.*

A powder mill was built early in the war at Morristown, New Jersey, by Col. Ford, and being amply supplied with saltpetre by the inhabitants, afforded considerable supplies when they were most needed. The Provincial Congress of New York, in 1776, offered premiums of £100, £75, and £50, for the first three powder mills, capable of making 1000 lbs. per week, erected in the State. Henry Wisner built a powder mill and published a method of making it. Maryland, in 1775, authorized a loan of £1000 toward the erection of one or more saltpetre works, and half a dollar per pound for the product. A like sum was voted to build a provincial powder mill. Saltpetre works were the next year in operation in Cecil County, under John Mingle, and in Hartford County, under Amos Garrett. The tobacco houses in Maryland and Virginia, were also dug up, and the earth lixiviated for nitre. It yielded about an ounce to the quart, and produced much enthusiasm for a time. The discovery of a "sulphur mine" in Virginia, was announced to Congress in 1775, and a messenger was dispatched for samples of the mineral. Many similar discoveries were made elsewhere. Nitre was manufactured in April, 1776, at Warwick and Petersburg, and the Provincial Congress resolved to set up a third factory in Halifax County, under Commissioners, who were to receive 1*s.* a pound. It appropriated £500 for a powder mill in the same county. A Virginian, also, published directions for making gunpowder. North Carolina offered £25 per cwt. for saltpetre, and £200 for the first 500 weight of gunpowder equal to English powder of 85*s.* the cwt.; also, £100 for the first 1000 lbs. weight of refined sulphur. As early as 1707, South Carolina passed a law to encourage the manufacture of saltpetre and potash; and in November, 1775, voted premiums of £200, £150, £100, and £50, respectively, for the first works that produced each 50 lbs. of good merchantable saltpetre. Sums of £200, £100, and £50, were offered for the first sulphur works, producing 100 lbs. of refined sulphur, which the State agreed to take at 5*s.* per lb. over and above the premium. Georgia, also, encouraged the manufacture of saltpetre, sulphur and gunpowder.

These efforts, made under the pressure of a stern necessity, resulted in the permanent establishment of the manufacture of powder in several States, of which a striking example is stated in the text. They were, however, inadequate to the immediate necessities of the war, and considerable sup-

The Messrs. Christopher and Charles Marshall, chemists, commenced the manufacture of Sal Ammoniac and Glauber Salts, on a large scale in Philadelphia. Specimens of these salts had been presented to the American Philosophical Society, as early as 1786, by the manufacturers, who were among the earliest technical chemists in the country.

Clarified or Dutch Quills, are noticed as a new article of domestic manufacture in Boston.

A committee of Congress recommended a loan of $8,000 to John F. Amelung, the proprietor of an extensive glass manufactory in Frederick, Maryland.

June 5.—The steamboat built by John Fitch, propelled by twelve oars, made her first trip on the Delaware, as a passenger and freight boat, between Philadelphia and Trenton, performing eighty miles between four o'clock A. M., and five P. M., against a strong wind, all the way back, and sixteen miles of the distance against the current and tide. She thus accomplished the most successful experiment in steam navigation as yet made in Europe or America. During four months she continued to perform regularly advertised trips, between Philadelphia, Trenton, Burlington, Bristol, Chester, Wilmington, and Gray's Ferry, running about 8,000 miles in the season.

July 17.—Upward of half a ton of maple sugar was brought to Philadelphia, from Stockport, on the Delaware. A sloop also arrived, September 3, from Albany, with forty hogsheads of maple sugar, the property of Judge William Cooper, of Cooperstown, Otsego County, N. Y., the whole of it made on the waters of the Susquehanna. These samples were pronounced equal or superior in quality to the best Muscovado. Loaf sugar, made from the product of the maple tree, by Messrs. Edward and Isaac Pennington, sugar refiners, formerly of the West Indies, was also offered for sale, and considered equal to any made from cane sugar. Otsego County, though thinly inhabited, produced this year 300 chests of 400 pounds each. These and similar evidences of a rapid increase and improvement in an art, which, originally learned of the Indians, had throughout the Northern Colonies for many years yielded the families of farmers occasionally from one or two hundred to a thousand pounds

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plies were procured from the West Indies and elsewhere, to which end the commercial restrictions were somewhat relaxed. Much gunpowder was also obtained opportunely by capture. The first tariff laid a duty of ten per cent. on gunpowper, but admitted saltpetre and sulphur free. The price within a year or two fell to £3.12, or $16 per cwt. for powder, for which merchants paid in England, after deducting the drawback, 75*s.* or 76*s.* Some sulphur was obtained from the interior of Virginia, but chiefly by importation; and in 1791, saltpetre was cheaper in Philadelphia than in London. In 1793, the gunpowder magazine in Philadelphia, which then received none but American powder, contained nearly 50,000 quarter casks, manufactured in that State.

of sugar for a few weeks' labor, during the months of February, March and April, and had been greatly extended by the forced economy of the Revolution, were regarded, particularly by the friends of African emancipation, as pointing to a domestic source for ample supplies of sugar for the whole Union. Estimates based upon information given by Mr. Cooper and others, as to the average yield of each tree, the number per acre, and the extent of Sugar Maple lands in New York and Pennsylvania, went to show that 268,000 acres of such lands would supply, by the ordinary family labor, the whole demand of the Union for sugar and molasses, computed at about 42,000,000 lbs. annually. Each of the counties of Albany, Montgomery, Otsego, Tioga and Ontario, in New York, or of Northampton, Luzerne and Northumberland, in Pennsylvania, were supposed to contain more than that number of acres of sugar maple trees, to say nothing of the large number of sugar trees in other parts of these and in sister States. The subject was recommended by Mr. Henry Drinker, who made the previous year sixty barrels on his own estate, on the Delaware; by Dr. Rush, in a letter to the Secretary of State, published in the American Philosophical Transactions, and by Mr. Tench Coxe, who jointly published a pamphlet, detailing the utensils, materials and process, employed in the manufacture. Large quantities of maple sugar were also made in Vermont, New Hampshire, and other parts of New England.

The ship Columbia, of Boston, Captain Gray, having sailed, September 30th, 1787, with the sloop Washington, of ninety tons, for the northwest coast of America, and thence with furs to China, returned home by Cape of Good Hope, completing the first American voyage around the world.'

Samuel Slater, having completed, under many difficulties, and chiefly with his own hands since the 18th of January, the entire series of Arkwright machines, at Pawtucket, R. I., started at that place, the first complete and successful water-spinning mill for cotton in the United States. The machinery, operated by the water-wheel of an old fulling-mill, embraced three carding, one drawing and roving-machine, and seventy-two spindles. The skill and energy which thus introduced THE ERA OF THE COTTON MANUFACTURE, deserve to be commemorated in some lasting memorial by the American people. By the time list, he appears to have commenced with four carders and spinners, whose names were Torpen and Charles Arnold, Smith Wilkinson, and Jabez Jenks, to whom were soon after added Eunice and Ann Arnold, John and Varnus Jenks, and Otis Borrows.

Carolina planters about this time began generally to clothe their slaves in homespun, from the produce of their cotton fields. The material was usually prepared for the spindle by the field hands, who picked the seed from the wool, at the rate of four pounds per week; and having been spun in the family, it was sent to the nearest weaver. A manufacturing establishment of Irish settlers, near Murray's Ferry, in Williamsburg district, supplied the adjacent country.

A small cotton mill with eighty-four spindles, driven by water, was in operation near Statesburgh, and a woolen mill on Fishing Creek, near the Catawba River.

An unsuccessful attempt was this year made to introduce power-looms into Manchester, England.

The publication in Philadelphia, by Thomas Dobson, of the first half volume of the Encyclopedia Britannica, to be completed in fifteen volumes, quarto, with much original matter, at fifteen guineas, or seventy dollars, the subscription price of the English edition, was the commencement of an increased amount of enterprise in the printing business in the United States.[1] An edition of the Catholic Bible was also printed this year by M. Carey.

Benjamin Franklin and James Bowdoin, late Governor of Massachusetts, both distinguished friends and proprietors of American Manufactures died, the former in the eighty-fifth, and the latter in the sixty-fourth year of his age.

1791

The Committee of the Lords of Trade, to whom was referred in September, 1789, the Acts of Congress, imposing discriminating tonnage and other duties, with instructions to consider and report what proposals of a commercial nature were proper to be made to the Government of the United States, presented a report drawn up by Lord Liverpool. They recommended negotiation on the subject of duties; and while they admit the full right of the United States to impose duties "either for the purpose of revenue or of encouraging the produce or manufactures of their territories," by way of preventing such an increase of those duties as would exclude British manufactures, they suggest two provisions in the proposed treaty. First, "that the duties on British manufactures imported into the United States, shall not be raised above what they are at present." "It may be of use," they say, "to bind the United States not to raise those duties above what they are at present,

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(1) The publisher then had but 246 subscribers, and could procure only two or three engravers. One thousand copies of the first volume were printed; two thousand of the second; and when he had completed the eighth, the subscription extended so far as to render it necessary to reprint the first. He then found no difficulty in procuring printers for the work. In 1786, four booksellers thought an edition of the New Testament for schools a work of risk, requiring much consultation, previously to the determination of the measure.—*Hopkins's Oration before the Academy of Fine Arts.*

by obtaining an express stipulation for this purpose; but, if this concession cannot be obtained, it may be sufficient perhaps to stipulate that the duties on British manufactures should not at any time be raised above the duties *now* payable on the like manufactures imported from Great Britain into France and Holland, according to the commercial treaties with those powers."

The second proposition was, "that the duties on all other merchandise, whether British or foreign, imported from Great Britain into the United States, shall not be raised higher at any time than on the like merchandise, imported from any other European nation." As the basis of a commercial treaty, they offered the single proposition, that British ships should be treated in United States ports in like manner as American ships shall be treated in the ports of Great Britain. It could not, however, be admitted, *even as a subject of negotiation*, that this principle of equality should be extended to the Colonies and Islands of Great Britain; or, that United States ships should there be treated as British. The profitable circuitous trade by which ships from Great Britain, carrying British manufactures to the United States, there load with lumber and provisions for the West Indies, and thence return with the produce of the Island to Great Britain, they say, was wholly a new acquisition, created by his Majesty's order in Council (of 1783), which had operated to the increase of British navigation, compared with that of the United States, in a double ratio, "but it has taken from the United States more than it has added to that of Great Britain." The retention of the American market, and the carrying trade, was thus an object of especial desire,(1) but the urging of it was postponed by the revolution in France, which operated to the increase of American manufactures and navigation.

In conformity with a plan suggested by the Secretary of the Treasury, for providing a circulating medium for the requirements of government and trade, Congress established at Philadelphia (February 25), the United States Bank, with a charter for twenty years, and a capital of $10,000,000, divided into 25,000 shares, one-fifth of which were held by the government. In conjunction with the funding system, the active capital thereby created was deemed favorable to the restoration of public credit, and the progress of commerce and the arts. It was the fourth institution of the kind in the country, banks already existing at Philadelphia, Boston and New York; and others went into operation this year at Baltimore and Providence.

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(1) Pitkins's Statistics.—Mr. Pitt's bill for a temporary regulation of communication between the two countries, proposed in March, 1783, failed through the violent opposition of the navigation interests, headed by Lord Sheffield, and the death of the Chancellor. The orders of the King in Council, in whom the authority was subsequently lodged, wholly excluded American vessels from ports in the British West Indies; and several staple American productions, as fish, beef, pork, butter, lard, etc., when carried in British ships. The mercantile interests, also, procured the rejection of a plan for a commercial treaty on principles of reciprocity, proposed by Mr. Adams, the American Minister in London, who thereupon strongly recommended the States to pass Navigation Acts, which was done by several of them.

On March 2, a slight amendment was made in the last Tariff Act, by which the duty of one cent per pound on bar and other lead was extended to all manufactures, wholly or chiefly of lead; and that of seven and a half per cent. on chintzes and calicoes was made to include all printed, stained and colored manufactures of cotton or linen.

At the call of Secretary Hamilton, an act was also passed (March 3), laying, on spirits imported after 30th June, a considerably higher duty, varying from twenty to forty cents a gallon, according to strength, and an excise duty of eleven to thirty cents, upon domestic spirits, distilled from molasses, sugar, or other foreign materials; and of nine to twenty-five cents per gallon on that made from materials the growth or produce of the United States. For the collection of these duties, each State was made a collection district, with as many supervisors as were necessary, whose duty it was in the case of home-distilled spirits, to appoint officers each to have charge of one or more distilleries, to gauge, prove and brand every cask, according to its contents; and having collected the excise in cash, or by bond, to give a certificate, without which it could not be removed, on pain of forfeiture. On private stills, in country places, using domestic materials, a yearly duty of sixty cents per gallon on the contents of the still was imposed. Every distiller was required to place upon his buildings, and the doors of his vaults, the words "Distiller of Spirits," and before commencing the business, was to enter in writing, at the nearest inspection office, a particular description of his buildings and apartments; when they were subject to the inspection of the officers, who were also to furnish, and from time to time inspect books, in which the distiller was required to make a daily entry of the quantity and quality of spirits distilled, sold, or delivered, according to the marks; and to verify the same by his oath, or affirmation. An allowance equal to the duty in each case, less half a cent per gallon was allowed, by way of drawback upon spirits exported; and upon spirits distilled from molasses in the United States, an additional allowance of three cents per gallon, equivalent to the duty laid upon molasses. The net product of the duties was pledged for the payment of interest on loans, and the surplus, if any, to the reduction of the public debt; and the act was to cease when these objects had been attained.

The discrimination co-operated with the duty of three cents upon molasses to favor the grain distillers of the United States. Notwithstanding considerable opposition, strengthened by a resolution of the Pennsylvania Assembly, then in session, against it, the act passed by a vote of thirty-five to twenty-one. The large number of private distilleries affected by this important act (amounting it is said to at least five thousand in the State of Pennsylvania alone), caused strong remonstrances to be also made in that State, and in North Carolina, Virginia and Maryland, where stills were likewise numerous. The legislative dissent thus expressed, doubtless encouraged the active resistance made during the next three years to the enforcement of the act, particularly in the four western counties of Pennsylvania. Commencing in North Carolina, the whisky rebellion assumed its most formidable proportions in Westmoreland, Washington, Fayette and Alleghany counties, where a large body of Scotch and Irish distillers and farmers questioned the power of the new government to impose so heavy a tax upon the only staple which would bear the cost of transportation, by the means then in use, to the eastern or other distant markets.

Opposition to the excise commenced in a public meeting, held July 27, at Redstone Old Fort, (Brownsville, to which the Legislature has recently restored the old name), on the Monongahela. It was more fully organized by a Convention held at Pittsburg, later in the year, embracing some of the most wealthy and influential citizens of those counties, and was countenanced by the western members, Smiley and Findley, who had opposed the law in Congress, and denounced it among their constituents. Mr. Gallatin, afterward the able Secretary of the Treasury, also opposed the law, without sanctioning unconstitutional modes of resistance. Many outrages were committed upon the officers of the excise, or their supporters. The collection was only enforced after some modifications of the law had been made, and a vigorous exercise of authority by the Federal Executive had suppressed an insurrection of alarming extent.

The distillation of molasses was chiefly carried on in the seaport towns, particularly in New England. In this business, Massachusetts exceeded all the other States together, and had, in 1783, no less than sixty distilleries. The extent of the business is indicated by the quantity of molasses imported into the United States, which amounted for the fiscal year to the unusual number of 7,194,606 gallons. The total exports of American spirits in the same time were 513,234 gallons.

President Washington, having made a tour to the Southern States after the adjournment of Congress, thus recorded his impressions of the favorable influence of the measures of Government upon the credit and industry of the country. "In my tour, I confirmed by observation the accounts which we had all along received of the happy effects of the General

Government upon Agriculture, Commerce and Industry. The same effects pervade the Middle and Eastern States, with the addition of vast progress in the most useful manufactures."

The evidences of progress are also referred to in his speech to the second Congress, at its first assembling, and proof of public confidence in the strength and resources of the Government, was found in the fact that the whole subscription to the Bank of the United States was filled in a single day.

Samples of the first yarn, and of the first cotton cloth made in America, from the same warp, were presented, October 15th, to the Secretary of the Treasury. A portion of it in the possession of Mr. Clay, in 1836, was as fine as No. 40.[1]

A manufactory of Turkey and Axminister carpets was in operation in the Northern Liberties, Philadelphia, conducted by William Peter Sprague, who about this time wove a national pattern, with a device representing the crest and armorial achievements pertaining to the United States.

A "Society for the Promotion of Agriculture, Arts, and Manufactures," was formed in New York, under the presidency of Hon. Robert R. Livingston, whose name also appears among the patentees this year, for a mechanical improvement in spindles.

Through the exertions of Alexander Hamilton, an association of individuals in New York, New Jersey, and Pennsylvania, was also formed for establishing useful manufactures, by the subscription of 5000 shares, of $100 each (of which only 2267 were fully paid up). With a view to the establishment of a great emporium of manufactures, and as a primary object the manufacture of cotton cloth, the company selected the Falls of the Passaic as the seat of their operations, the Great Falls having been ascertained to have an elevation of 104 feet, and to be capable of driving 247 undershot water-wheels, and the Little Falls four miles above, a fall of 36 feet, sufficient to drive 78 water-wheels. The Society was fully organized at New Brunswick, under the following directors: William Duer, John Dewhurst, Benjamin Walker, Nicholas Low, Royal Flint, Elias Boudinot, John Bayard, John Neilson, Archibald Mercer, Thomas Lowring, George Lewis, More Furman, and Alexander McComb. Mr. Duer was chosen the first governor. The company was incorporated by the Legislature of New Jersey under the name of "The Society for the Establishment of Useful Manufactures," with extensive privileges, including a city charter, over a district six miles square, then containing about ten houses, which they named

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(1) Memoirs of Slater, 89.

Patterson, in honor of Judge William Patterson, the Governor of the State. They invited and encouraged artizans and manufacturers to settle there, by leasing water privileges and by aiding them with capital. Though not at first successful in their immediate purpose, they became the founders of that flourishing centre of industry, by attracting thither artizans and manufacturers of different kinds, even from England and Scotland, many of them having been engaged by Mr. Hamilton, at the request of the company, before the act of incorporation. (*Vide* A. D. 1794.)[1]

At least 32,000 tons of shipping were built in the United States this year. The largest amount built in any one year, before the war, was 26,544 tons.

The cotton crop of the United States was set down at about two millions of pounds, of which one and a half millions were grown in South Carolina, and half a million in Georgia. The total export of American cotton was 189,316 lbs., the average price of which, at the place of exportation, was 26 cents per lb.[2]

The quantity of potash and pearlash manufactured this year in Vermont, was estimated at one thousand tons.[3] This was about one-sixth of the whole amount exported from the United States.

The first patents for machines for threshing grain and corn, were this year granted (March 11) to Samuel Mulliken of Philadelphia, who took out four other patents at the same time, and (Aug. 2) to William Thompson of Richmond, Virginia. Patents were issued (Aug. 26) to Messrs. James Rumsey, John Fitch, Nathan Read, John Stevens, and Englehart Cruse, severally for various modifications of steam apparatus, and for the application of steam as a motive power to navigation, and other economical uses, for which it began about this time to be employed in this country. Several of the patentees had previously obtained exclusive privileges from some of the State Legislatures. A machine for spinning cotton by water power was patented (Dec. 31) by William Pollard of Philadelphia, who put it in operation in that city, but did not succeed.

Mr. Jefferson, Secretary of State, to whom was referred the petition of Samuel Breck and others, proprietors of a sail-cloth manufactory in Boston, asking the exclusive privilege of using particular marks to designate their manufactures, reported that it would conduce to fidelity in manufactures to grant to each establishment the exclusive right to some mark on its wares proper to itself. He recommended a general law on

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(1) Barber & Howe's Hist. Coll. of N. J. —White's Memoir of Slater.

(2) Woodbury's Treasury Rep. 1835–6.—Pitkins' Statistics.

(3) Williams' Hist. Vermont.

the subject, so far as it related to goods intended for exportation, over which alone Congress had jurisdiction.

In obedience to the resolution of the first Congress of January 15, 1790, Mr. Hamilton, Secretary of the Treasury, laid before the House of Representatives his able and voluminous report on the subject of Manufactures.

In collecting and analyzing the materials for that elaborate document, the Secretary employed a great amount of industry, and all the energies of an acute, comprehensive, and powerful mind. His labors resulted in presenting to the nation such a broad yet circumstantial view of the importance of this branch of the national industry in all its relations, its resources, prospects, and claims on the patronage of Congress, and in shaping such a system for its encouragement in harmony with all the great interests of the country, as has seldom been furnished to any government. His able refutation of the current objections to the encouragement of manufactures, his vindication of their importance as a source of public wealth and happiness, of the necessity of countervailing commercial regulations, and his suggestions as to the best means of promoting manufactures, all evince the clearest comprehension of the whole subject, and an intimate knowledge of their existing condition. The paper is replete with calm and forcible reasoning, practical views, and the soundest maxims of political economy, while it preserves a dignified abstinence from those acrimonious and invidious references to the policy of rival nations, which were sometimes heard from prominent members in the national councils.

The Report was a noble appeal to the nation in behalf of a branch of the public economy, which had a limited though increasing number of ardent supporters, but of which the importance was not generally apprehended, and was even the subject of considerable misapprehension. It well nigh exhausted the arguments in defence of manufactures, and its principles and logic have formed a common resource for later reasoning on the same subject. The remarkable forecast, and appreciation of the merits of the subject displayed in guiding the legislative patronage into the channel of manufactures, at a time when public occurrences in Europe were about to lead enterprise and capital strongly in the direction of commerce, is the more conspicuous, inasmuch as the Secretary's previous associations had been rather with the commercial than with the manufacturing classes. We regret that our limits do not permit us to present in full, this first Official Report on Manufactures, made to our government—a State paper in many respects one of the ablest in the national archives, and we are unwilling to mar its general excellence, by lengthy extracts, or any attempt at abridgment.

Many of the arguments, moreover, in favor of manufactures, which were novel then are axioms now. We must, however, advert to the fact, that he scouts as mischievous and erroneous the idea of conflicting interests between the Northern and Southern States. He says, "Ideas of a contrariety of interests between the Northern and Southern regions of the Union, are, in the main, as unfounded as they are mischievous. The diversity of circumstances, on which such contrariety is usually predicated, authorizes a directly contrary conclusion. Mutual wants constitute one of the strongest links of political connexion; and the extent of these bears a natural proportion to the diversity in the means of mutual supply. Suggestions of an opposite complexion are ever to be deplored as unfriendly to the steady pursuit of one great common cause, and to the perfect harmony of all the parts." The unity of interest is shown by reference to the demand which would be created in the North for raw materials, among which, cotton, indigo, lead, coal, hemp, flax, and wool, were either peculiar to the South, or produced there in greater abundance and of better quality. "The extensive cultivation of cotton," it is observed, "can, perhaps, hardly be expected, but from the previous establishment of domestic manufactures of the article."

Referring the reader to the Report in full as given in Hamilton's works, we shall limit our extracts mainly to the facts which show the progress which had been made in manufactures up to this period.

1. IRON.—Peculiar advantages and inducements for the prosecution of the Iron manufacture, existed in the abundance and quality of nearly every quality, and the plenty and cheapness of fuel, particularly charcoal. Productive coal mines were already worked, and there were indications of an abundance of coal in many other places. Proofs had been received that manufactories of Iron, though generally understood to be extensive, were much more so than commonly supposed. Several trades, of which Iron was the basis, required but small capital. Iron works were carried on more numerously, and more advantageously, than formerly, and the price of Iron had risen, chiefly on that account, from about $64, the average before the Revolution, to about $80.

In the manufacture of *steel* considerable progress had been made, and some new enterprises on a more extensive scale had been lately set on foot. There was no doubt it could be made to supply all internal demands and a considerable surplus for exportation.

The United States already in a great measure supplied themselves with nails and spikes. They were able and ought to do it entirely. The first and most laborious operation was performed by water-mills, in which boys were chiefly employed, who thus acquired early habits of industry. It was not less curious than true that in certain parts of the country, the making of nails was an occasional family manufacture. The expediency of an additional duty on these articles, was indicated by the fact that in the course of the year ending September 30, 1790, about 1,800,000 lbs. of them were imported into the United States. A duty of two cents per pound would probably put an end to such an importation, a thing in every way proper to be done. An inspection of the articles intended for exportation might be desirable to secure more care and honesty than was observed in this and some other branches. Implements of husbandry were made in several States, and could be made to supply the whole country. Edge tools of different kinds were also made, and much hollowware. Although the business of casting was less perfect than might be wished, it was improving, and as respectable capitals were engaged in this and other infant branches of the Iron manufacture, they might all be soon acquired.

Manufactories of fire arms and other military weapons already existed, which only required a certain demand in order to supply the whole United States. It would aid them, and be a means of public safety, if a certain quantity were purchased annually, to form arsenals, in which a competent supply should always be kept. It might become desirable to establish manufactories of all necessary weapons on government account, according to the reasonable practice of other nations. It appeared improvident to leave the instruments of national defence to the casual enterprise of individuals. It seemed one of the few exceptions to the general rule that government manufactures were to be avoided.

2. COPPER.—Manufactures of this article (including those of brass) were also of great extent and utility. The material was a natural production of the country, and mines of it had been profitably wrought. It could be obtained easily and cheaply from Ohio. Coppersmiths and brass-founders, particularly the former, were numerous, and some of them carried on extensively.

3. LEAD—Abounded in the United States, and could be made to more than supply the domestic demand. A prolific mine of it had long been wrought in southwestern Virginia, and under public administration, yielded considerable supplies during the late war. It was now in the hands of individuals, who not only carried it on with spirit, but had established manufactories of it at Richmond.

3. FOSSIL COAL—Was important as an instrument of manufactures, for household fuel, and as an article of freight coastwise, as signally exemplified in Great Britain. Several coal mines were worked in Virginia, and there were appearances of deposits in many places. A bounty on coal of home production, and premiums for opening new mines, if

thought necessary or useful, were warranted by the importance of the article.

4. WOOD.—Several manufactories of this article flourished in the United States. Ships were nowhere built in greater perfection, and cabinet-wares, generally, were made little, if at all inferior, to those of Europe. Their extent was such as to have admitted of considerable exportation. An exemption from duty of all woods used in manufactures, seemed to be all that was required, and was the policy of other nations. An early and systematic preservation of the stock of timber and magazines of ship-timber were desirable.

5. SKINS.—Few manufactories were of greater importance. They were recommended by their influence on agriculture in promoting the raising of cattle. In the principal branches, the progress was such as nearly to defy foreign competition. Tanneries were carried on, both as a regular business, and as an incidental family manufacture. Farther encouragement, by an increased duty on manufactories of leather, and by prohibiting the exportation of bark, which, in consequence of exportation, it was alleged, had risen in price within a few years from three to four and a half dollars per cord, seemed to be expedient, although it was not certainly so. The rise in price of bark was more probably due to increased home demand and diminished supply, than to exportation. One species of bark being in some sort peculiar to the United States, and the material a valuable dye in some manufactures in which the United States had begun a competition, was made an additional reason for a prohibition, and the importance of the leather branch might justify increased duties. Glue, which was rated at five per cent., might be subjected to an excluding duty, with benefit to this branch. It was made in great quantities, and like paper, was an entire economy of materials, otherwise useless.

6. GRAIN.—Manufactures of several kinds of grain were entitled to peculiar favor, both as being connected with subsistence and the support of agriculture. A general system of inspection for flour in all domestic ports, would improve its quality and reputation; but difficulties stood in the way of it. Next to flour, ardent spirits and malt liquors, of which the former were made extensively, and the latter to a considerable extent, were the principal manufactures of grain, and the exclusive home market for both should be secured as fast as possible. Existing laws had done much toward this, but additional duties on foreign distilled spirits and malt liquors, and perhaps an abatement of those on domestic spirits, would more effectually secure it. An increased duty would benefit the distillers of molasses as well. The price of molasses had been for some years successively rising in the West Indies, owing partly to fresh competition, partly to increased demand in this country; and the late dis-

turbances in the islands would enhance it still more. This high price, and the duty of three cents per gallon, rendered it difficult for the distillers to compete with West India rum, which was of superior quality. Hence, a greater difference in the duties on foreign and domestic spirits was deemed proper even by the most candid distillers. Geneva, or gin, was extensively consumed in this country, and distilleries of it, though but recently grown to any importance, were becoming of consequence, and required protection. The smaller cost of some materials, and of labor, in Holland; the large capital employed in the business there, and other circumstances, rendered it difficult for distillers, under the present duty, to compete with the foreign article. An addition of two cents per gallon on foreign spirits of the first class of proof, and a proportionate increase in those of higher proof, was therefore recommended, and a deduction of one cent per gallon on domestic spirits of the first proof, and a proportionable deduction in the higher classes of proof.

By far the greater part of malt liquors consumed in the United States was the produce of domestic breweries. The whole should, and probably could be supplied by them. In quality, though inferior to the best, they were equal to the greater part of those usually imported. A growing competition, increased by whatever would attract capital into that channel, would still improve them. A duty of eight cents per gallon generally, in lieu of the existing duty, would be a decisive encouragement, and probably banish the inferior qualities; and with a prohibition of all importation, except in casks of considerable capacity, would ultimately supplant all foreign malt liquors.

7. Flax and Hemp.—The importance of the linen branch to agriculture; its effects in promoting household industry; the ease with which the materials could be produced at home, and the great advances made in the coarser fabrics, especially in families, constituted claims of peculiar force to the patronage of Government. This patronage could be rendered by promoting the growth of materials, by restraining foreign competition and by direct bounties or premiums upon the home manufactures.

As to hemp, something had been done in the first mode, by a high duty on foreign hemp, and on the whole, was not perhaps exceptionable. Bounties or premiums seemed either too expensive, or too unequal toward different parts of the Union, and were otherwise attended with practical difficulties. With regard to foreign competition, duties on imports were the most obvious expedients. Sail cloth already employed a flourishing factory at Boston, and several promising ones in other places.

8. Cotton.—There was something in the texture of this material which adapted it in a peculiar degree to the application of machinery.

The signal utility of the lately invented cotton-mill had been noticed, but other machines of scarcely less utility were employed on it with exclusive, or more than ordinary effect. This circumstance particularly recommended cotton fabrics, to a country deficient in hands. The variety and extent to which the manufactures of this article are applicable still farther recommended them.

A vigorous pursuit of the cotton branch in its several subdivisions was still farther recommended by the faculty of the United States to produce the raw material of a quality which, though alleged to be inferior to some, was capable of being used in many fabrics, and would probably by more experienced culture be carried to much greater perfection.

In addition to what had been previously stated, it was announced that a Society was forming with a capital, which it was expected would be extended to half a million of dollars, and measures were in train for prosecuting, on a large scale, the making and printing of cotton goods.[1] These circumstances indicated the propriety of removing obstacles, and adding such encouragements as might appear proper and necessary to the successful prosecution of the manufactories in question. The present duty of three cents on cotton was a serious obstacle. The injurious tendency of duties on raw material, as regards manufactures, and their inutility in preventing the growth of the material, were before adverted to. Cotton had not the same claims as hemp, because not generally grown throughout the country, and on account of its shorter and weaker fibre, doubts were entertained of the quality of the national cotton for manufacturing. It would be wise to let the infant manufactories have the full benefit of the best materials, which was the more necessary, as workmen were more unskilled and inexperienced. Inexpert workmen made great waste of indifferent materials. A repeal of the duty on cotton was therefore recommended. A more encouraging substitute would be a bounty on the national cotton when wrought at home, and an additional bounty on exportation. The British bounty on coarse linens applied also to certain kinds of cotton goods of similar value. One cent per yard, of a given width, on all goods of cotton, or cotton and linen, made in the United States, with one cent additional per pound on the material, when of domestic growth, would be a considerable aid both to the production and manufacture. The magnitude of the object would justify the expense. The printing and staining of cottons was a distinct business. It was easily accomplished, and added much to the value of white goods, and deserved to be encouraged. A drawback of the whole

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(1) The Society referred to was that incorporated by the Legislature of New Jersey, and which commenced operations at the Falls of the Passaic, near Patterson.

or part of the duty on imported white cottons, would be a powerful encouragement until such time as there was a domestic supply. The duty of seven and a half per cent. on certain kinds of cottons, if extended to all goods of cotton, or principally cotton, would probably counterbalance the effect of the proposed drawback on the fabrication.

"Manufactures of cotton goods not long since established at Beverly, in Massachusetts, and at Providence, in the State of Rhode Island, and conducted with a perseverance corresponding with the patriotic motives which began them, seem to have overcome the first obstacles to success; producing corduroys, velverets, fustians and jeans, and other similar articles, of a quality which would bear a comparison with the like articles brought from Manchester. The one at Providence had the merit of being the first to introduce into the United States the celebrated cotton-mill, which not only furnishes materials for that manufactory itself, but for the supply of private families for household manufacture."

Other manufactures of the same material, as regular businesses, had also been begun at different places in the State of Connecticut, but all upon a smaller scale than those above mentioned. Some essays were also making in the printing and staining of cotton goods. There were several small establishments of this kind already on foot.

9. WOOL.—In a climate like ours, the woolen branch could not be regarded as inferior to any which relates to the clothing of the inhabitants. Household manufactures of this material were carried on to a very interesting extent. But the only branch which could be said to have acquired maturity, was the making of hats. Hats of wool, and of wool and fur, were made in large quantities in different States, and materials only were wanting to render the manufacture equal to the demand.

"A promising essay toward the fabrication of cloths, cassimeres, and other woolen goods, is likewise going on at Hartford, in Connecticut. Specimens of the different kinds which are made, in the possession of the Secretary, evince that these fabrics have attained a very considerable degree of perfection. Their quality certainly surpasses any thing that could have been looked for in so short a time, and under so great disadvantages; and conspires with the scantiness of the means which have been at the commamd of the directors, to form the eulogium of that public spirit, perseverance and judgment, which have been able to accomplish so much."

To promote an abundant supply of wool, would probably best serve to cherish and promote this precious embryo. To encourage the raising and improving the breed of sheep for this end would be the most desirable expedient, but might not be sufficient, as it was yet doubtful whether our wool was capable of being rendered fit for the finer fabrics. Premiums would best promote the domestic, and bounties the foreign supply. The first might be accomplished by an institution to be hereafter submitted. The last required specific legislation. A fund for the purpose of duties could be derived from an addition of two and a half per cent. to the present rate of duty on carpets and carpeting, which might encourage some beginnings already made toward their manufacture at home.

10. SILK—Is produced with great facility in the United States. Some pleasing essays were made in Connecticut. Stockings, handkerchiefs, ribbons and buttons were made, though as yet in small quantities. A manufactory of lace on a scale not very extensive, had been long memorable at Ipswich, in Massachusetts. An exception of the materials from the present duty on importation, and premiums upon the production, to be dispensed under the direction of the institution before alluded to, seem to be the only encouragement advisable at so early a stage.

11. GLASS.—The materials of glass are everywhere found. In the United States, there was no deficiency. The sands and stones called *tarso*, which include flinty and crystalline substances generally, and the salts of various plants, particularly of the sea-weed Kali, or Kelp, were the essential ingredients. Fuel was abundant for such manufactures. They however required large capitals and much manual labor. Different manufactures of glass were on foot in the United States, and received considerable encouragement in the duty of two and a half per cent. If more was given, a bounty on window-glass and black bottles would be the most proper. Bottles were an important item in breweries, and a deficiency was complained of.

12. GUNPOWDER.—No small progress had been made of late in the manufacture of this important article. It ought to be considered as already established, but its high importance renders its extension desirable. Its present encouragement was a duty of ten per cent. on the rival article, and the free admission of saltpetre. It would be proper also to exempt sulphur from duty, as little had been as yet produced from internal sources. Its use in finishing the bottoms of ships was a farther reason. To regulate its inspection would also have a favorable tendency.

13. PAPER.—Manufactures of paper were among those which had arrived at the greatest maturity and were most adequate to national supply. Profitable progress had been made in Paper hangings. This branch was adequately protected by the duty on imported articles, in the list of which shooting and cartridge paper were however omitted, and being simple manufactures necessary to military supply, and in shipbuilding, were equally entitled to encouragement with other kinds.

14. PRINTED BOOKS.—The great number of presses in the United States, was sufficient to render us independent of foreign countries for

the printing of the books used in the country. The business would be aided by a duty of ten per cent. instead of five, as now charged. The difference, it was conceived, would have no unfavorable tendency upon the supply of books to families, schools, and other seminaries of learning. With the wealthier classes of professional men, the difference of price would be little felt; but books imported for the use of particular seminaries and public libraries, should be totally exempted. A constant and universal demand for books in general family use, would stimulate to an adequate domestic supply, for which the means were ample, and ultimately would probably cheapen them. To encourage the printing of books would also encourage the manufacture of paper.

15. Refined Sugar and Chocolate—Were among the extensive and prosperous domestic manufactures. Drawbacks of the materials used in cases of exportation, would benefit the manufacturer and conform to the precedent, in the case of molasses, and distilled spirits. Cocoa paid a duty of one cent per pound, while chocolate, which was a prevailing and very simple manufacture, was rated at only five per cent. Two cents per pound on chocolate it was presumed would not be inconvenient.

In regard to the measures thus proposed, it was suggested that although bounties were difficult to manage and liable to frauds, these objections were more than countervailed by their advantages when rightly applied. They had been shown to be indispensable in some cases, particularly in the infancy of new enterprises. They should however be dispensed with great circumspection. They should be confined to regular manufactories and not to incidental or family manufactures. A diminution of revenue might be feared by the arrangements submitted. "But there is no truth which may be more firmly relied upon, than that the interests of the revenue are promoted by whatever promotes an increase of national industry and wealth." The measures proposed would probably for some time to come, rather augment than reduce the public revenue.

The additional duties to be laid, should be appropriated in the first instance to replace all defalcations arising from an abolition or diminution of duties pledged for the public debt. The surplus would serve:

First. To constitute a fund for paying the bounties which shall have been decreed. Secondly. To constitute a fund for the operations of a board, to be established for promoting arts, agriculture, manufactures and commerce.

An outline of the plan of this institution, of which different intimations were given in the Report, was briefly as follows—

To set apart an annual sum under the management of three or more commissioners, composed of certain officers of government and their successors.

The commissioners were to apply the fund to defray the expenses of the emigration of artists and manufacturers in particular branches of extraordinary importance; to promote by rewards the prosecution and introduction of useful discoveries, inventions, and improvements; to encourage by honorary and lucrative premiums, the exertions of individuals and classes in relation to objects they were charged with promoting; and to afford such other aids to those objects as may generally be designated by law.

The commissioners to render an annual account of transactions and disbursements. Monies unapplied at the end of three years, to revert to the treasury. They might be authorised to receive voluntary contributions for specific objects.

The government, it was conceived, might thus aid in supplying skillful workmen, the want of which, there was reason to believe, had retarded particular manufactures, and in importing and stimulating useful improvements, among which machinery was an important item.

The operation of premiums had been favorably illustrated in the case of certain public and private societies, of which the Pennsylvania Society for the promotion of manufactures and useful arts was an example, although its funds were too limited to produce more than a very small portion of the good to which its principles would have led.[1] "It may be confidently affirmed, that there is scarcely any thing which has been devised, better calculated to excite a general spirit of improvement than institutions of this nature. They are truly invaluable."

"In countries where there is great private wealth, much may be effected by the voluntary contributions of patriotic individuals; but in a community situated like that of the United States, the public purse must supply the deficiency of private resources. In what can it be so useful as in promoting and improving the efforts of industry?"

The Report of the Secretary, so unequivocal in its principles, and so lucid and ample in its reasoning, created very general satisfaction among the friends of American industry. It infused new energy into many branches of manufactures, and induced the mechanical classes to enlarge and diversify their operations. A disposition too generally prevailed at the time, to ascribe undue influence to the measures of government in

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(1) In our first volume we have several times adverted to the influence of this Society, as well as to that of one or two of a kindred character in this country. The premiums, honorary rewards, and other efforts of the London Society, are also frequently referred to, and unquestionably exerted much influence upon the progress of Agriculture, Chemistry, Mechanics, and other departments of the useful and fine arts in England and her colonies.

determining the success of manufactures, which in general is far more dependent upon the aggregate of individual enterprise and skill. The proposition embodied in the Report to give direct encouragement to manufacturing enterprises, and especially the plan to which he was believed to be zealously devoted, to establish under a charter from the State of New Jersey, a large manufacturing corporation, was regarded with jealousy by some manufacturers. The special privileges and aid to be accorded such societies, were complained of as subversive of private interests, by securing to large monied and privileged monopolies an unjust advantage in regard to raw materials, and profits in certain branches of business. The project of a joint stock company, to be incorporated for manufacturing purposes by the State of Maryland, was opposed for the same reason.

The publication of the Report in England, early in the following year, also created much alarm in the manufacturing districts. Meetings were called in many of the towns, and fifty thousand pounds are said to have been subscribed at a single meeting in Manchester, to be invested in English goods, for the purpose of overstocking the American market, and thereby discouraging the newly excited hopes of manufacturers.[1]

1792

In lieu of the drawback on salt intended for the fisheries allowed by the act of 20th July, 1789, Congress authorized the payment, during seven years, of one dollar per ton, to fishing boats under twenty tons; one dollar and fifty cents per ton, on vessels of twenty to thirty tons; and two dollars and fifty cents per ton, on vessels above thirty tons; the allowance to each not to exceed one hundred and seventy dollars. Toward the close of the session an additional bounty of twenty per cent. was allowed on vessels engaged in the Bank or other cod-fishery.[2] By these acts, navigation and ship-building were greatly promoted.

Petitions were received and read in Congress, from the tanners of New York, New Jersey, and Pennsylvania, praying relief from the inconveniences suffered by the erection of mills to grind tanners' bark for exportation, representing that a patent had recently been granted to an individual in England, for the importation of oak bark for dyeing and tanning, whose agents in the different States were paying on an average for shaved bark, from ten to thirteen dollars per cord, and that this increase in the price of bark, from three to four dollars and a half per

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(1) Address of American Society, for encouragement of Domestic Manufactures, to the people of the United States, Dec. 31, 1816.

(2) Laws of United States.

cord, which it had been for several years previously, must injure or prevent the manufacture of leather, which, in the United States, was an important branch. A committee, in consequence, recommended an increase of the duties on leather and shoes.[1] The export of ground oak bark for the year ending Sept. 30, was two thousand nine hundred and twenty-one hogsheads, against one thousand and forty the previous year.

Some preliminary steps having been authorized by the first Congress, a code of laws was adopted (April 2), for the establishment of a Mint, at the seat of government, (Philadelphia), and the regulation of the coins of the United States. The officers were to be a Director, Assayer, Chief Coiner, Engraver, and Treasurer. Bullion brought to the mint, was to be assayed and coined free of expense, or exchanged on the spot for coin with a deduction of one half per cent. Dr. David Rittenhouse was the first Director. The Mint was established in Seventh street above Market, where a portion of the building still remains, in which it was conducted for about forty years. The power first used in the coining department, was that of four or five horses, which gave place to a steam engine after the partial destruction of the building by fire in 1815.

As the most feasible mode of meeting the expenses of the Army, which, since the defeat of St. Clair, had been augmented for the defence of the frontier, the Secretary of the Treasury made a report recommending a temporary increase of the duties on imports, by an addition of two and a half per cent. to manufactured articles which then paid five per cent. This measure, however much to be regretted as an increased burthen upon commerce, and on account of the disadvantages of frequent change, Mr. Hamilton hoped might succor and aid the manufacturing spirit, already more extensively prevalent than ever before, and thus "serve to promote essentially the industry, the wealth, the strength, the independence and the substantial prosperity of the country."

In near conformity with his recommendations, additional duties were granted by a new act, May 2, raising the average rate of duties to about thirteen and a half per cent. In apportioning the rates, regard appears to have been had to the spirit of the Secretary's Report on Manufactures. Mr. Madison and some others, who had formerly opposed the duty on hemp and cordage, as injurious to the navigation interests, now supported an increase, as at once a protection to Manufactures and Agriculture. Copper in pigs and bars, *lapis caliminaris*, unmanufactured wool, wood and sulphur, were to the same end added to the free list. Cotton was originally added to the same list, and some Massachusetts and Pennsylvania members desired to retain it there, as an article

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(1) American State Papers.

needful to their manufactures, and only to be obtained from abroad. The old duty of three cents per pound, was allowed to remain upon the assurances of Southern members, that it was raised in South Carolina in abundance and of good quality, and that there was no market for it.

To render the excise law more acceptable, a reduction was also made by a new act, of from one to seven cents per gallon, according to proof and material used, upon spirits distilled within the United States. The highest rate was fixed at twenty-five cents, and the lowest at seven cents per gallon. The owners of small country stills of less capacity singly or together than four hundred gallons, were to pay fifty-four cents per gallon yearly on the capacity of their stills, or if they preferred it, seven cents per gallon on the product, or ten cents monthly upon the capacity of the still, with the privilege of taking out a license for one month instead of a year; a provision which greatly alleviated their burthens.

Among the most useful of the numerous societies organized toward the close of the last century for the advancement of Agriculture and the Useful Arts, was the "Massachusetts Society for promoting Agriculture," incorporated March 7, of this year. By a judicious use of its funds in holding public exhibitions, offering rewards for the encouragement of agriculture and the arts, in importing improved agricultural implements and breeds of stock, and machinery to serve as models for manufacturers, and in collecting and disseminating information through its agents and publications, it has been alike servicable to agriculture and many branches of manufactures. A "Chemical Society" was formed in Philadelphia, to analyze minerals, give an account of them, and encourage the manufacture of chemicals. It was under the patronage of Drs. Seybert and Woodhouse.

By a British order in council of April 1, American manufactures were first admitted into that kingdom.

A turnpike road from Philadelphia to Lancaster, a distance of sixty-two miles,—the first improvement of this kind in the United States—was commenced in June by a private company. Two thousand two hundred and seventy-six shares were sold, and thirty dollars paid on each share in about twelve hours. The shares being limited by law to six hundred dollars, a lottery was instituted to reduce the subscriptions to the legal number. The work was completed in 1794, at a cost of $465,000, and the road was afterward paved with stone and subsequently Macadamized.

The Rev. Dr. Stiles, of Connecticut, was shown a silk gown belonging to Rev. Mr. Atwater of Branford, manufactured throughout in his own family from material raised by him, being the first article of the kind of purely domestic production in the United States. In January of the previous year, he saw a pair of white silk stockings weighing four ounces, woven at Norwich in that state, in a loom made in the town; also a handkerchief made at Northfield, which weighed two and a half ounces—both made of silk raised in New Haven and Northfield. Several dresses of beautiful changeable silk, of even and lustrous fabric and bright and fast colors, were the same year spun and woven from native cocoons in the family of Mr. Brandagee of Berlin. One of these, of red and black, was intended for the lady of General Washington, but for some reason was not presented.[1]

The manufacture of Linseed oil was commenced at Easton, Mass., and for a number of years, from an annual stock of three thousand bushels of seed, produced as many gallons of oil.[2] Its price in Philadelphia at this time was 2s.1d., and in London 2s.3d. to 2s.4d.

1793 The Patent Law of 1790 was repealed, and a new act passed, (Feb. 21,) prescribing the formalities to be observed in obtaining letters patent, the rights of inventors and the fees to be paid, which were fixed at thirty dollars, exclusive of charges for copies of papers or drawings.

In March, the Society for the promotion of Useful Arts of the State of New York was incorporated, and had its charter renewed 2d April, 1804. Early in the same year "The Lehigh Coal Mine Company" was formed to work the anthracite coal, recently found at Mauch Chunk, Pa.

About this time Almy, Brown & Slater, of Providence, built at Pawtucket a small cotton mill, (the first built by them, and long known as the Old Factory,) in which seventy-two spindles were employed, which were gradually increased as prospects became more encouraging. Into this mill Slater introduced such regulations as his experience in England taught him would most conduce to the comfort and efficiency of the operatives, and the success of the establishment. Among these was the system of Sabbath-school instruction, which had been twelve years or more in use in England, and for some years in the mills of Messrs.

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(1) Holmes' Annals; Blydenburg's Silk-worm, vol. 7.

(2) The attention given to the raising of flax seed for exportation in colonial times, caused the early erection of oil mills, which in some states and particularly in interior towns, remote from market, became quite numerous. The exportation of seed and also its manufacture into oil, was encouraged by various measures of the local legislatures. Oil making was at this time on the increase. It was commenced as early as 1715 in New York, and in 1718 oil was produced in Connecticut by John Prout, Jr. The Moravians, Tunkers, and others in Pennsylvania also, erected oil mills at an early date, and in 1786 there were four within a few miles of Lancaster. Several in Winchester, Virginia, at the same date, paid 2s. and 2s.6d. a bushel for flax seed. A writer in 1789 suggested its use for making soap, as it sold in Philadelphia for 4d. the pound, and for much less in the interior towns.

Strutt and Arkwright, in Derbyshire. These, which were the first of the kind in New England, as well as public worship and day schools, often supported at his own expense, were encouraged in connection with all the mills in which he was subsequently interested. This exerted a favorable influence upon the moral and intellectual character of the work-people, which in New England factories has ever since been well sustained.[1]

Conducive to the same end, was the establishment this year of a Mechanics' Library, in New Haven, Conn.; one of the earliest of these useful institutions.

A subscription to the amount of $25,000 was about this time made in the territory south of the Ohio, for the purpose of carrying on the cotton manufacture. The population of the territory was only 30,000 whites and 5,000 blacks.

The caterpillar, (*noctua xylina,*) cotton moth or chenille insect, which in 1788 destroyed 280 tons of cotton in the Bahamas, and afterward caused the culture of the gossypium to be abandoned in several of the West India Islands, first made its appearance this year in Georgia. It caused nearly a total destruction of the crop. From one field of 400 acres only eighteen bags were made.[2]

Committees of Congress to whom were referred petitions of the manufacturers of cordage, twines, lines, and pack-thread, in Philadelphia and Providence, and of printers and booksellers in Philadelphia, reported that the former branch was a most important manufacture in the United States, whether considered in reference to commerce and navigation, or the number of persons it employed. The exports of cordage were considerable and would probably increase. They recommended an allowance to exporters of domestic cordage equivalent to the duty on hemp, and an increased duty on cod or other lines. In addition to many paper mills then running, several large ones were building, and in preference to a reduction of duty on printers' paper, which the petitioners said was inconveniently scarce, they recommended that rags be exempted from duty on importation.

The political revolution in France having brought on a declaration of war against England and Holland, was followed during the early

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(1) White's Mem. of Slater.—The general introduction of Sabbath-schools is believed to have done much to prepare the way for Mechanics' Institutions. Those established by Slater have been spoken of as the first in America. But a Sunday-school, probably the first in the world, was opened some years before the Revolution at Ephrata, in Lancaster Co., Pennsylvania, by Ludwig Hoecker and others of the German Seventh Day Baptists, whose school-house was used as a hospital after the battle of Brandywine. A Sunday-school Society, under the presidency of Bishop White, was instituted in Philadelphia in 1791, and incorporated in 1796.

(2) Seabrook's Memoir of the Cotton Plant.

part of the year, by treaties between Great Britain, Russia, Spain, Prussia, and Germany, prohibiting the exportation of military and naval stores, grain and other provisions, from their ports to those of France. The proclamation by General Washington of strict neutrality in the contest, and the opening of the French colonial ports, enabled the United States to engross nearly the whole of the carrying trade of Europe, and gave an immense impulse to the foreign commerce and agriculture of the United States. The increased demand and high price during the next twenty years, of agricultural productions and shipping, attracted an unusual amount of capital into these branches, and in the same proportion withdrew it from manufacturing enterprises, with the exception of ship-building, which was increased to a degree unparalleled in any age or country. The tonnage of the United States at the close of this year, exceeded that of any other nation except Great Britain; and the increase alone of registered shipping, during the next fifteen years, amounted to 480,572 tons. In proportion to population, the United States had already taken rank as the most commercial nation. Its trade, in point of value, was only second to that of Great Britain. The exports were estimated at $33,026,233, an increase of more than one fourth over those of 1792, and they continued to increase during the war.

Peter Legaux, a Frenchman, having in 1787 commenced a vineyard with 150 plants from Burgundy and Champagne, at Spring Mill on the Schuylkill, in Montgomery county, had at this date 18,000 foreign and native vines growing. In consequence of his success, and upon his representations, the Legislature of Pennsylvania passed an act, to continue in force twenty years, authorizing the Governor to incorporate "The President, Managers, and Company, for promoting the cultivation of vines" in the state, so soon as 500 shares of twenty dollars each had been subscribed. Commissioners were appointed to open subscriptions, but failing to obtain the full amount, the time was extended by subsequent acts until 1802, when the company was organized with Mr. Legaux as chief vintner.[1]

Eli Whitney having, in November of the last year, turned his attention to the construction of a machine for cleaning cotton, completed his first working model of the saw gin. The cylinder was only two feet two inches in length and six in diameter. It was turned by hand by one person, and was capable of cleaning fifty pounds (after separation) of green seed cotton in a day. Mrs. Greene, the generous patron of the invention and the first instigator of the contrivance, eager to communicate the knowledge of an invention so important to the state, of which

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(1) Laws of Pennsylvania, chaps. 1,653, 1,694, 2,110, 2,160.

the markets were then glutted with all the ordinary staples, and the negroes without employment, invited to her house gentlemen from different parts of the state. The day after their arrival she conducted them to a temporary building erected for the machine, and they saw, with delight and astonishment, that more cotton could be separated in one day by a single hand, than could be done by the ordinary mode in many months. Its success being no longer doubtful, Mr. Phineas Miller, the husband of Mrs. Greene, (also of Connecticut, and a graduate of Yale College,) and the friend and patron of Whitney, entered into co-partnership with him for the purpose of maturing and patenting the machine at the expense of Mr. Miller. The articles provided "that the profits and emoluments to be derived from patenting, making, vending, and working the same, should be mutually and equally shared between them." They immediately after commenced business; Mr. Whitney having repaired at once to Connecticut to complete the machine, obtain a patent, and manufacture and ship to Georgia, as many machines as would supply the demand. Application for a patent was made to Mr. Jefferson, then Secretary of State, who promised to grant it so soon as the model was lodged in the patent office. An affidavit of the invention was also filed, with the notary public of the city of New Haven. But the patent was not issued until the following March. Before this, however, and ere the inventor had reached Connecticut, in consequence of the imprudent exhibition of the machine above referred to, and the intense excitement created, encroachments upon the rights of the proprietors had already commenced. Intelligence of the invention had spread far and wide throughout the state, and multitudes came from all parts to see it. This privilege being properly denied them until a patent could be secured, some of the populace, unrestrained by law or justice, broke into the building by night and carried off the machine. A number of gins, with slight evasive deviations from the original, were constructed and put in operation before the patent was obtained. A series of wholesale depredations upon the rights of the inventor, of which there are few such examples on record, was now commenced, and received little check either from the gratitude or the moral sense of the community. The unfortunate arrangement of Whitney and Miller, toward the close of the year, to erect gins throughout the cotton district, and engross the business of ginning for a toll of one third, instead of selling the machines and patent rights, stimulated the spirit of infringement. The operation was too extensive and complicated for the means of the proprietors, and was unsatisfactory to the planters. As a monopoly, it furnished a pretext and a market for an illegal manufacturer of the machines, which ultimately involved the patentees in more than sixty expensive and annoying lawsuits; and compelled Whitney, early to abandon all hopes of compensation for his invaluable discovery, especially in Georgia, and to find a more profitable exercise of his talents in another field. He afterward met, however, a more generous appreciation of the value of his invention in other states.[1]

Previous to this time, as appears from a letter of Moses Brown of Providence, to J. S. Dexter, Nov. 1791, American cotton had been so badly cleaned, that Samuel Slater could not be induced to use it, and obtained his supply under the charge of the impost from the West Indies. Mr. Brown suggested that some encouragement be given to the raising and cleaning of cotton fit for the manufacturer.

The manufacture of combs was carried on to considerable perfection and profit, at Leominster, Mass. Two or three manufacturers together employed constantly ten and occasionally twenty hands, who made about 6,000 dozens annually. One manufacturer, Jonathan Johnson, employed five men, who made yearly 2,500 dozens. Ivory combs of excellent quality were made by one person. At West Newbury, where

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(1) Memoir by Professor Olmstead, in Amer. Jour. of Science for 1832. The importance of this truly *revolutionary* instrument, in its relations to the political, social, and industrial interests, not only of the United States but of the world, may justify a farther reference to the peculiar circumstances of its origin. Whitney, who was born in Westboro, Worcester Co., Mass., in Dec. 1765, exhibited very early evidence of energy and remarkable mechanical ability, as well before as during his residence at Yale College, where he graduated in 1792. On his way to Georgia to fulfill an engagement as a teacher in a private family, he made the acquaintance of Mrs. Greene; and on his arrival, finding another teacher employed, he was invited to make his home in her family while he pursued the study of the law. Having displayed his inventive talent in the construction of a tambour embroidery frame on a new plan, Mrs. Greene recommended him to a company of revolutionary officers assembled at her house, who were regretting the want of a means of cleaning their green seed cotton, with the remark, "Gentlemen, apply to my young friend, Whitney, he can make any thing." Having never seen cotton or cotton seed, he went to Savannah, (it being out of season for cotton in the seed,) and searching the ware-houses and boats, found a small parcel of it. Encouraged by Mr. Miller, he secluded himself in a basement room, and with such rude implements and materials as were at hand, he made tools better suited to his purpose, and drew his own wire, (of which the teeth of his earlier gins were made,) an article not then to be found in the market of Savannah. He is said to have obtained his first clue to the invention and the use of metallic points, by the accidental use of a toothpick to try the tenacity of the seed, while reflecting upon the subject during a walk (De Bow's Rev. xv. 473). Within ten days after his plan was conceived he had constructed a small model; and encouraged by the result, proceeded to make a larger one, which was completed and exhibited as above stated, in April. Although it has undergone some modifications, the principle has entered into all the most efficient ginning machines since employed. Thus was opened to the southern agriculturist an unbounded source of wealth in a new staple, without which his prospects were poor indeed. The exports of cotton in 1793, were 187,600 lbs., in 1794, 1,601,760, and in 1795, 6,276,300 lbs.

the business first commenced, large quantities of horn combs were also made; and the two towns here mentioned, have ever since been the principal seats of the business. At Graham's comb factory on Charter St., Boston, combs of good workmanship were also made at this time, and probably in some other places. The importation of combs had greatly decreased since the peace in 1783.[1]

Among the patents granted this year, the most important were a machine for manufacturing tobacco, by James Caldwell and C. Batterman, Jan. 26, which was employed in an extensive factory owned by Mr. Caldwell, near Albany, N. Y. (see A. D. 1794); an improvement in windmills, by Joseph Pope; and in the manufacture of bricks, by Christopher Colles (Jan. 26); both among the most skillful mechanics and engineers in the country; double pendulums and clock pendulums, by Robert Leslie of Phila. (Jan. 30); the manufacture of oiled silk and linen, by Ralph Hodgson (Feb. 1); an improvement in paper moulds, by John Carnes of Del. (April 11); manufacturing rhus or sumach, by R. Rosewall Saltenstall (May 1).

1794

A line of packet boats, two in number, commenced running between Cincinnati and Pittsburg, and were advertised to perform the voyage, each, once in every four weeks; passengers would be made safe under cover, proof against rifle or musket balls, with convenient port holes for firing out of. Each boat was armed with six pieces, carrying a pound ball, and a number of good muskets and plenty of ammunition.

During the past and present years several new branches of manufacture were attempted in Philadelphia. A number of carding machines for cotton and wool were constructed, eight spinning frames on the Arkwright principle, and several mules of one hundred and twenty spindles were erected at the Globe mill in Northern Liberties. James Davenport was granted letters patent, Feb. 24, for weaving and beating sail duck,

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(1) Whitney's Hist. Worcester Co., 198, Mass. Hist. Coll. 3,277. The first manufacture of horn combs in America, appears to have been about the year 1759. In that year Mr. Enoch Noyes, a self-taught mechanic of West Newbury, commenced, without previous instruction, the making of horn buttons and coarse combs of various kinds. He continued the business until 1778, when he employed William Cleland, a deserter from Burgoyne's army, a comb-maker by profession, and a skillful workman. That town has ever since held a leading place in the business. Combs were made in Philadelphia, as appears by the card of Christopher Anger, combmaker, in Oct. 1759, informing the public that he continued to supply, wholesale or retail, all sorts of combs, and also powder horns and punch-spoons. The Provincial Congress of Mass. in Dec. 1774, recommended to the people, among other things of public utility, the encouragement of horn-smiths in all their various branches. Isaac Tryon of Conn., a soldier of the Revolution, made combs by a machine of his invention, patented in 1798.

and soon after proceeded to erect at the same establishment an ingenious set of machinery for spinning and weaving flax and hemp by water power. Ten good English stocking frames were imported, and several new ones were made by Messrs. Hadderly & Ouram, who came from England expressly to carry on the business, to which they had been regularly bred. Two Europeans also brought out with them the machinery for spinning and drawing gold and silver wire, and the manufacture of thread lace and embroidery, articles of large consumption for a young country. The manufacture of straw and chip hats was about this time introduced, and was for a time carried on with success and profit; twenty dollars' worth of raw materials being converted into $2000 worth of hats. Wrought mohair and silk buttons had also been made for a year or two at Germantown, by a native of Germany. His patterns were much approved, and were fast getting into fashion when an English imitation of them is said to have been sent in such quantities as to compel him to give up the business, as also happened afterward in the case of straw hats. Two or three experienced potters from England set up their business, but soon abandoned it for want of encouragement. Nearly all these, and several other attempts made about the same time, contended for a number of years with foreign competition, but most of them were ultimately abandoned or changed hands, the projectors going into other business.[1]

On March 26, an embargo was laid for thirty days, and at its expiration was renewed for thirty days longer.

In accordance with a resolution of 2d January, Congress passed, March 27, an act, authorizing the President to provide and equip a naval armament against the Algerine cruisers, to consist of four ships of forty-four guns and two of thirty-six guns each. Six frigates, the Constitution, President, and United States, each of forty-four guns, and the Chesapeake, Constellation, and Congress, of thirty-six guns each, were immediately put on the stocks at the following ports respectively, viz.: Boston, New York, Philadelphia, Portsmouth, Va., Baltimore and Portsmouth, N. H. This formed an initial step toward a national navy.

In May a patent was granted by the British government to Robert Fulton, a native of Little Britain, Pennsylvania, for a "double inclined plane" to be used in transportation. The Society of Arts in London, also granted him the silver medal for the invention of a mill for sawing marble and other stone, which was then at work near Torbay in Devon. A model of it was presented to the Repository of the Society.[2] A machine for spinning flax and another for making ropes, afterward patented in England by Fulton, it is supposed were invented about this time.

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[1] Essay on the Manufacturing interests of the United States by a member of the Society of Arts, Philadelphia, 1804.

[2] Repertory of Arts, vol. 17. Trans. of Society of Arts, v. 12, p. 329.

In June Congress passed acts to lay a duty upon carriages, which from October 1st were to pay, whether public or private, an annual rate of one to ten dollars each; a duty on licenses for retailing wines and liquors; to make all stills not entered liable to forfeiture and limiting the privilege of drawback on exportation to quantities of one hundred and fifty gallons or upward; and duties of eight cents per pound on snuff and two cents per pound on refined sugar manufactured in the United States.

The manufacturers of snuff and refiners of sugar were required, twenty days before commencing business, to render an exact account in writing of every house or building, snuff mill and mortar, or sugar pan and boiler employed by them, and give bonds in $5000 each to keep and render quarterly—on pain of forfeiting all such mills and utensils and the sum of $500—an exact account of all snuff or refined sugar made and sent out by them, of which they were to make oath annually. The duties on manufactured tobacco and refined sugar were increased to four cents a pound each and on snuff to twelve cents when imported from abroad. No refined or lump sugar was to be imported after 31st of December in vessels under one hundred and twenty tons, or packages or casks of less than six hundred pounds, and no drawback was to be allowed on manufactured tobacco, snuff or refined sugar exported, except that made in the United States, which in quantities of twelve dollars' worth, was allowed a drawback equal to the duty, with an additional drawback on sugar of the three cents duty chargeable on raw sugar used by them.[1]

These laws were followed by a general modification of the tariff, increasing the duties to an average rate of about fourteen per cent., and two days after, by a duty of one quarter to one half per cent. on the purchase money of all sales at auction. The internal duties were limited to two years.

A number of petitions relative to import and excise duties, were presented to Congress from manufacturers and others, in different parts of the country. The manufacturers of paint, and dealers in oil and painters' colors, in Baltimore and Alexandria, petitioned (Jan. 22), that the duties on dry paint might be taken off and an equivalent duty be laid on paints ground in oil, or be so regulated as to encourage the grinding of them in the United States. Samuel Swann and others of Richmond, asked (Feb. 10) for an additional duty on imported coals,

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(1) Laws United States.

or other encouragement for opening coal mines in the United States. Messrs. Walley, Tudor, Payne, and McLean, of Boston, prayed (Feb. 13) for additional duties on window-glass.[1] The merchants and manufacturers of iron, and ship-builders, in and near Philadelphia (Nov. 3), desired a repeal of the import on bar iron, and were followed (18th) by a counter petition, from Levi Hollingsworth and other proprietors of iron works in the state, asking a continuance of the duty on bar and cast iron, or other encouragement for the erection of furnaces and forges in the United States.[2] Mr. Trappal, of Newark, asked for encouragement to the stocking manufacture by increased duties on hosiery. The manufacturers of tobacco in Philadelphia, petitioned (May 2) against the proposed excise on snuff and tobacco.[3] Memorials were also received from the manufacturers of hats in New York, Pennsylvania, Delaware, and Virginia, and from other classes in the country.

The act which was approved on 7th June, laid on coffee and clayed or lump sugar, one cent per pound, on cocoa two cents, cheese three cents, shoes five cents a pair, boots twenty-five cents, coal half a cent per bushel; on carriages, four and a half per cent., and two and a half to five per cent. on most of the articles paying *ad valorem* duties, in addition to the rates already payable. Ten per cent. was added on goods brought in foreign vessels. By this act, cotton and linen goods (plain excepted) paid twelve and a half per cent., and iron, brass, copper, and tin wares, leather, hats, window-glass, etc., paid fifteen per cent. *ad valorem*, the highest rate, except on wines, spirits, teas, coaches, certain kinds of glass, and a few others. The act was to have force until Jan. 1, 1797.

The first incorporated woolen company in Massachusetts, erected a factory at the Falls of Parker River, in Byfield Parish, Newbury. The machinery was made in Newburyport, by Messrs. Strandring, Armstrong, and Guppy. The stockholders were Wm. Bartlett, principal, afterward sole owner, Wm. Johnson, Nicholas Johnson, Michael Hodge, Joseph

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(1) A Glass Company in Boston, incorporated in 1787, commenced the manufacture of window glass in a new factory, of large size and improved construction, on 11th Nov., 1793.

(2) Pennsylvania was the largest producer of pig and bar iron at this time, and considering the number and extent of the furnaces and forges, it was estimated that the new iron works erected in the state since 1787, were equal to one half of all those built before and during that year.

(3) In the debate on the resolution for a tax on snuff, May 1, Mr. Murray of Maryland stated that snuff was then made and sold in the country for twenty-five cents a pound, equal in quality to what was formerly imported and sold for seventy-five cents. His colleague, Mr. Smith, considered the tax would tend to destroy the staple of three or four states; others regarded it as one of the best on the list.

Stanwood, Mark Fitz, Mr. Currier of Amesbury, Mr. Parsons (late Chief Justice), Jonathan Greenleaf, James Prince, Abraham Wheelwright, Philip Coombs, and others. The English operatives by whom it was started, were Arthur, John and James Scholfield, John Lee, Mr. Aspinwall, Abraham and John Taylor, John Shaw, and James Hall, principally from Oldham and Saddleworth, England.[1]

Among the manufactures of Boston at this date, were soap, candles, rum, loaf-sugar, cordage, duck twines and lines, cards, fish-hooks, combs, stained paper, stone ware, glass, etc. Great improvements had been made in some of these since the Revolution, as well in the quality as in the process of manufacture. Soap and tallow candles had been long manufactured. By newly invented American machines, great expedition and saving of cotton had been effected in the business of candle making. Spermaceti candles of superior quality, were made and exported in large quantities, by four different factories. The privilege of making sperm candles, was granted Benjamin Croft, as early as 1751.[2]

There were thirty distilleries and seven sugar refineries, the latter capable of making yearly 100,000 lbs. each, on an average. A large incorporated sail duck factory, made sail cloth which was in high repute. There were several manufactories of cloth and wool cards, one of fish-hooks, Graham's comb factory on Charter St., which, with similar works in other parts of the country, had greatly diminished the importation of combs. Paper hangings were made in sufficiency for the supply of the state, and also for exportation to other states. Mr. Fenton, from New Haven, had recently erected a stone pottery on Lynn St., where Liverpool ware was made and sold lower than the imported. The clay was obtained from Perth Amboy. Iron and brass cannons, balls, stoves, and hollow-ware, were made at the foundry of Paul Revere. Chocolate had been long made from the large quantities of cocoa obtained in the West India trade, and had been greatly expedited by recent inventions. The chocolate mill of Mr. Welsh, at the north end, could turn out twenty-five hundred weight daily. Calico printing was carried on with considerable skill, and the general use of calico since the peace, rendered it increasingly profitable. Plain India cottons were imported for that purpose; but the importation of printed calicoes was large. Pot and pearlash, which had been made there for forty or fifty years, had then ceased, on account of the scarcity of wood. Considerable quantities made in inland

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(1) Stryker's Amer. Register, vol. 2, p. 388.

(2) In 1760, Newport, R. I., had seventeen sperm candle and oil works. Lord Sheffield (1783) states, that the spermaceti candles manufactured in the colonies, exceeded in value the oil sent to Europe. The duty on spermaceti in England, was £18 per ton, or nearly prohibitory, and the manufacture of candles for the West India market was consequently great.

towns, were inspected in Boston and shipped abroad. Mr. Wm. Frobisher, of the town, had contributed to the reputation and manufacture of American potash, by investigating the principles of the process, and by demonstrating its superiority for soap-making. Dr. Townsend, the inspector at that time, had also published a pamphlet on the manufacture and inspection of pot and pearl ashes.[1] Glass works, as

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(1) Potash was an important product of the American forests, and in later colonial times was exported in considerable quantities. Its production was strongly recommended to the first settlers of Virginia, and was even enjoined by the terms of some of the patents of land. In 1619 and 1620, men were sent thither, in part, for that business. Its manufacture was limited in England, where ashes cost 12*d.* a bushel, in addition to the cost of collecting them from culinary fires. In 1623 a patent was granted to Sir Wm. Russell and others, for a method of making hard soap "with a material called Barilla," without the aid of fire; and also for making potash from the stalks of peas, beans, kelp, fern, and other herbaceous plants, which are richer in alkaline salts than wood. It was renewed in a subsequent reign, and yielded the exchequer, it is said, £10,000. The increasing use however, of those carbonates in the arts, and the interruption of trade with Russia, whence the chief supply was obtained, caused the price of potash to advance from £12 a ton in 1620, to £40 or £50 in 1650. This made it an object to encourage its production in America, where forests were an incumbrance; and potash could be economically made as a collateral process in the act of clearing the lands. The manufacture was early attempted in several colonies. As early as 1707, a law was enacted in South Carolina, "for encouraging the making of Potash and Saltpetre." In New York, where several potasheries, one of them at much cost, were set up under the Dutch dynasty, the business was renewed by a London gentleman about 1709, but without success. About twenty-five years after it was attempted in New Jersey, and again a few years later, in New York, by Mr. Hasenclaver. Experiments were made by John Benn in 1735, and in 1741 a factory was set up in Connecticut, by Samuel Willard and others. About the middle of the last century Parliament remitted the duties on potash, and encouraged its importation from the colonies. Under its patronage Mr. Thomas Stephens, in 1756, published in London, "A method and plain process of making potash," and the same year came to America, (where his book with the proof bottles were offered for sale,) in order to advance the business. With letters from members of Parliament and Gov. Belcher of Mass., he purchased in Philadelphia, in connection with the Messrs. Franklin and others, the potash works of "the Liverpool Company," which had suspended business. They erected a large furnace and additional buildings, and in one month put the new process in operation, in the presence of Governor Denny and other gratified spectators. Thence he proceeded to the Rappahannock in Virginia, for the purpose of starting another factory of the Liverpool Company, which had been given up, and from that to Georgia.

The increased consumption of potash in bleaching, calico-printing, glass, soap, and other manufactures; and its decreasing production in the north of Europe, induced the Society of Arts in London, about 1761, to offer a premium of £4 for every ton of merchantable pearlash imported into London from the colonies, and large premiums also for the cultivation of Kali or glass-wort for Barilla, in the colonies south of the Delaware. Between that time and 1782, the Society paid nearly £900 in pecuniary rewards, and distributed fourteen honorary gold medals to promote the manufacture in America, in which they were quite successful. Among other persons of capital who embarked in the business, was Mr. Edward Quincy, a merchant of Boston, who was encouraged thereto by a personal visit to the already mentioned, were in operation; hats formed a considerable branch of manufacture, the fine beaver hats being considered preferable to the English.

Considerable quantities of various household manufactures found a

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Society in 1760,and six years after wrote to Mr. Hollis, a member, that the business was then so firmly established, that it needed no further assistance from them, than how to assay it, and detect frauds, and maintain its credit. (He states by the way, that he had also encouraged the silk culture to his utmost.) Among the medals awarded by the London Society, was one in 1767 to Dr. Wm. Lewis, and one in 1768 to Robert Dossie, Esq., for practical essays describing the process pursued in America where the best potash was made, the latter also prescribing the management of glass-wort. These treatises, which were circulated with the list of premiums in the colonies, and some American essays on the same subject, gave quite an impulse to the business before the Revolution. Of the American essays, one was a quarto pamphlet published in 1757, in Boston; and another, in 1765, described the process of calcining pearlash as practiced in Hungary, with a cut of the furnace. A Society in New York, on the plan of the London Society, of which Mr. Hasenclaver, before mentioned, was a member, also, in 1764, offered premiums of £30 for the greatest quantity of potash, not less than five tons, made in the province; and smaller sums for less quantities. Premiums were also offered by the Society for the Encouragement of Arts in Pennsylvania, and works were, in 1772, erected in Philadelphia by Wm. Henderson, and in 1787 by John Rhea and probably others. Many persons in England and America, in the hope of large profits, engaged in the business on too large a scale, and as in other branches were ruined. New England, Massachusetts particularly, and New York were the largest producers. The number of potash works in Massachusetts in 1788, was nearly 250. The first in the state is said to have been erected on a very large scale, near Belchertown, Hampshire Co. An immense building was put up and lined with iron bound vats and tubs, and in the centre were built four large furnaces, the fires of which met in a common flue where the intense heat was intended to evaporate the lye, conducted to it in a small stream while the dry salt fell into a pan beneath. After a great outlay for apparatus, ashes, etc., the fire was urged upon a stream of lye, when the chimney suddenly blew up and the proprietor was obliged to boil the lixivium in pans and finally to abandon an impracticable plan. Potash works of large extent were afterward erected at Suffield, Conn., by a Scotch company, who brought every portion of the apparatus with them, and by prudent management and business tact succeeded better. From that time potasheries were built on a more inexpensive plan and were more remunerative. In 1789 some of the most profitable works were set up at a cost of less than twenty dollars, exclusive of iron kettles, which were the chief item of expense. At the date in our text, the business was a large and increasing one in Vermont, nearly every town having one or more potasheries. The business was well understood and much effort was made to improve it. The product was equal to any in America. In Lancaster county, Mass., there were many pot and pearlash works. The first complete *ton* of potash sent to market is said to have been from Ashburotiam, in that county, where it was made almost from the first settlement in 1735. The first introduction of iron kettles in the business has also been ascribed to Colonel Caleb Wilder of Lancaster, in the same county (*Whitney's Worcester*). By the laws of Massachusetts (Nov. 1784), Pennsylvania (1790), and other exporting states, pot and pearlash intended for exportation were subject to a careful assay or inspection as to quality and packing before shipment, which contributed to the reputation of American alkalies. The manufacture and exportation increased rapidly after the peace, and were encouraged by the bounties of different Societies and Legislatures.

market in Boston, and paper was made at twelve mills in the state. Powder was made at Andover and Stoughton. Cannon and iron tools, and implements, as axes, hoes, shovels, scythes, etc., and nails of all kinds in different places. Slitting mills were erected at Stoughton, a cotton mill at Beverley; women's shoes, to the number of 170,000 pair, were annually made at Lynn, and snuff in large quantities in several towns. Within a few miles of Boston the following and some other articles were made, viz.: tow cloth, cotton and linen sheeting, thread, checks, bedticks, striped flannels, thread cloth and worsted hose, gloves and mitts, diapers, cotton and woolen coverlets.[1]

In July of this year the extensive tobacco manufactory belonging to Mr. James Caldwell near Albany, was consumed by fire, with a stock valued at $37,500. A loan of $20,000 was immediately opened by his friends at the bank; the Legislature of the state resolved to assist him with a like sum, and the work people of the city volunteered their labor to assist in its reconstruction. Extensive works for the manufacture of roll and cut tobacco, Scotch and rappee snuff, mustard, chocolate, starch, hair-powder, split peas and hulled barley, were commenced and put in operation within eleven months. The works were decidedly superior to any of the kind in America. All the operations, even to the spinning of tobacco, were performed by water power. The most important machinery was the tobacco mill, patented by Mr. Caldwell and Christopher Batterman, Jan. 26, 1793, which manufactured about 100,000 lbs. annually. The operations employed the next year about fifty men and children.

In the same month, a fire also broke out in the large ropewalk of Edward Howe, near Gray's wharf in Boston, destroying that and six other factories, one-half the whole number in the town, in addition to about ninety-six other buildings, including forty-three dwellings. The largest, being at the west end of the town, were not damaged; one of the latter was one hundred and sixty fathoms long and could turn out a cable of about one hundred and forty fathoms. The selectmen requested that no more ropewalks should be built in the heart of the city, and tendered the sufferers the use of the west side of the Common, where they built six, which were burned down February 18, 1806. Five were rebuilt and again burnt in 1819. The first patent for manufacturing cordage was granted this year, June 16, to George Parkinson, who in 1791, had patented a machine for spinning flax and hemp. But the hemp and yarns used by the Boston ropemakers were mostly imported. There was also a company that manufactured twines and lines of every size,

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(1) Dr. Thacher in Mass. Hist. Coll. for 1794, vol. 3.

employing in 1792 over fifty hands. Their cod lines were considered equal to the noted Bridport lines from England.[1]

The discontents among the whisky distillers and others in Western Pennsylvania, on account of the revenue laws, aggravated by a scarcity of specie, now assumed the character of an open insurrection. By the temperate but vigorous action of the President, who issued two proclamations and a call for fifteen thousand militia, order and obedience to the laws were restored without bloodshed.

Aug. 20.—The victory of Gen. Anthony Wayne over the Ohio Indians near the rapids of the Miami of the Lakes, restored tranquillity to the north-western territory, and was followed by a rapid influx of population and the establishment of the industrial arts, to which security was given by the treaty of Greenville in the following year.

Nov. 19.—A treaty of commerce and navigation was negotiated between the United States and Great Britain. By the 2d section of the 15th article, Great Britain reserved the right of laying duties to countervail those payable on goods imported into the United States in British and American vessels. In relation to the West India trade, Mr. Jay on the part of the United States recommended the right of transporting sugar, molasses, coffee, cocoa, and cotton to Europe, neither he nor Mr. Greenville being aware, apparently, that the last named had become an article of export from the Southern States. The ratification of the treaty was therefore strongly opposed and for some time postponed.

The first calico-printing in Providence, R. I., was about this time commenced by Messrs. Schaub, Tissot, and Dubosque, in a chocolate mill on the present site of the Franklin foundry. Mr. Dubosque, who had

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(1) Ropemaking had been carried on in Boston and vicinity for more than a century and a half, having been commenced there in 1641, and in Charleston in 1663. In that as in several of the commercial cities, it had become an important branch of industry. The fatal Boston massacre of 5th March, 1776, which precipitated the Revolution, commenced in a skirmish with the workmen in John Grey's ropewalk near the site of the fire above mentioned, some of whom were the first victims. In the Federal procession in Boston, in Feb. 1788, the ropemakers, preceded by Mr. William McNeil, outnumbered any other class of mechanics, being seventy-five in number. The first ropewalk in New York city was built about 1718 along Broadway, between Barclay Street and Park Place. In 1755 several ropewalks extended in the direction of East Broadway from the Bowery. They became numerous and profitable in the city. Several ropemakers, having "large and curious ropewalks, especially Joseph Wilcox," are spoken of in Philadelphia in 1698. They had about sixty representatives in the Federal celebration in 1788, who bore the motto "May the production of our trade be the neckcloth of him who attempts to untwist the political rope of our Union." Ropemaking was an extensive business in later years. The first ropewalk in Baltimore was early erected by Mr. Lux, and Wm. Smith built one near Bond Street about 1771. In 1792–3 there were more manufactories in Maryland and Virginia, according to Coxe, than in any two of the states of New York, New Jersey, Connecticut, and New Hampshire. American cordage was preferred by our merchants, even in Colonial times, to the foreign.

been attached to the French navy, and married in Rhode Island, had learned the art in early life, as it was practiced in Alsace in France. The cloth printed was imported from Calcutta. The printing was done with wooden blocks, and the calendering by friction on a hard substance with flint stone—metal rollers being then unknown. A calendering machine was introduced there in 1790, and about the same time Herman Vandusen commenced calico printing in the same manner at East Greenwich, cutting his own blocks, but the business in Providence was the first of any extent in the state. Three years after calico printing was also carried on in Providence by Peter Schaub and Robert Newell.

The first sewing-thread ever made of cotton was this year produced by Samuel Slater of Pawtucket, who commenced its manufacture in Rhode Island, whence it extended into Europe. The idea is said to have suggested itself to Mrs. Slater, whose attention was attracted by the evenness and beauty of the yarn while spinning a quantity of Sea Island cotton. Some of it having been doubled and twisted, a sheet was made, half with cotton and half with linen thread, and the linen was the first to give way. The introduction of cotton stocking yarn in America is also ascribed to Slater. The prices of cotton twist yarn at this time were, for No. 12, 88 cents; No. 16, 104 cents; No. 20, 121 cents.[1]

The first cotton factory of Patterson, N. J., 90 feet by 40, and four stories high, began in 1792, was completed under the superintendence of Peter Colt of Hartford, who, in January 1793, had succeeded Major l'Enfant, a Frenchman, as engineer. Cotton yarn was spun in the mill, the first having been made the previous year with machinery moved by oxen. Calico shawls and other cotton goods were also printed, the bleached and unbleached muslins being purchased in New York. The Society likewise turned its attention to the culture of the silk-worm and directed the superintendent to plant mulberry trees.[2]

A steamboat with a stern wheel was navigated from Hartford, Conn., to New York city, by Samuel Morey of Connecticut, the builder.

The Massachusetts Charitable Fire Society was instituted to relieve sufferers by fire and to stimulate genius to useful discoveries for the preservation of life and property from destruction by that element.

An agent, Joseph Stacy Sampson, was about this time sent to England by Oliver Evans, with drawings and specifications of his steam engine, for the purpose of taking out a patent in connection with the English engineers. He published the next year the "Miller and Millwright's Guide," a very useful work to young mechanics and about the earliest systematic treatise on the subject by an American.

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(1) Memoir of Slater, 262, 293, 382.

(2) Ibid. 383.

The Legislature of New York granted £1500, to enable a Mr. Boyd to re-establish at New Windsor, in Orange County, a valuable set of works for the manufacture of scythes.

The most important patents issued this year were one to James Davenport (Feb. 24) for weaving and beating sail duck, which was put in operation at the Globe Factory in Philadelphia;[1] the cotton gin by Eli Whitney (March 14); a circular saw by Zechariah Cox (March 14); an improvement in manufacturing paper, etc., by John Biddle (March 31). This process for making paper was afterward put in operation by the patentee at New Milford, which town in its present shape was laid out by him, and a mill for making paper and pasteboard of nearly every kind, composed principally of saw-dust, was erected before the close of the century. An improvement in the steam still was patented (Sept. 2) by Alexander Anderson of Philadelphia, which by means of a condensing tub saved fuel and labor and was generally adopted. A threshing machine, patented (Nov. 5) by James Wardrop of Virginia, was the next year introduced in England.

1795

A supplementary tariff act, substituted after the first of March the following duties, viz.: on printing types ten per cent., and on girandoles twenty per cent. *ad volorem;* on white clayed or pure dried sugars three cents, and on all other clayed or powdered sugars one and a half cents per pound; on Malaga wine twenty cents and Burgundy and Champagne forty cents per gallon; imperial or gunpowder tea to pay the same as hyson.[2]

Memorials and remonstrances were received from the manufacturers of tobacco in Philadelphia, and the refiners of sugar in that city and Baltimore, praying for a revision or a repeal of the act of last session (June 5th), laying excise duties on snuff and refined sugar, and that a tax be laid on the pan or boiler, in lieu of two cents per pound on sugar refined in the United States.

The law was amended by repealing the eight cents duty on snuff and laying instead thereof, the following annual rates of duty on snuff mills after April 1st, viz.: upon every mortar contained in any mill worked by water, and upon every pair of millstones employed in the manufacture of snuff, $560; upon every pestle in any other than hand mills $140; upon every pestle in any mill worked by hand $112; and upon every mill in which snuff was manufactured by stampers and grinders $2240. Entries of the mills, buildings, and apparatus, to be made, and a license obtained before commencing business, and annually

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(1) See page 71.

(2) Laws of the United States.

thereafter. A drawback of six cents per pound was allowed on snuff exported in quantities of not less than 300 pounds at one time by the same person.

The shoe business of Lynn at this time employed about two hundred master workmen and six hundred apprentices, who made annually about 300,000 pairs of shoes, exported chiefly to the Southern States.

In March a number of public spirited individuals of the most industrious and and respectable of the mechanical classes in Boston formed the "Boston Association of Mechanics," for the promotion and regulation of the arts and the interests of their class. Having in a few months increased in numbers, resources and usefulness, in order to extend the benefits of the Society and meet the general desire to elevate the mechanic interests, they assumed the title of "The Association of Mechanics of the Commonwealth of Massachusetts," and were subsequently incorporated (May 1806) as the "Massachusetts Charitable Mechanics' Association," which became eminently useful in promoting ingenuity and good workmanship in the mechanical branches.

In July 14, the Spanish government made a grant to Senor Marquis de Maison Rouge, a French knight, of thirty superficial leagues of land in the rich alluvial bottoms of the Wachita river in Louisiana, on condition that he introduced a colony of thirty families by way of the Ohio, for the purpose of cultivating wheat, erecting mills, and establishing other useful arts. The Spanish governor was to pay $100 to each useful laborer or artificer, assist in their transportation thither and make a grant to each family of four arpents of land. The conditions were fulfilled by the Marquis according to agreement.

At North Providence, R. I., on the Pawtucket, were at this time three anchor forges, one slitting mill, two nail cutting machines, one tanning mill, one oil mill, three snuff mills, one grist mill, one cotton factory, one clothier's works, and three fulling mills, all carried by water.

A cotton mill of considerable extent, with Arkwright's water spring machines, was established at Warwick, Kent county, in the same state, and answered the highest expectations of the proprietors. It was followed in the next fifteen years by one cotton mill annually on an average, beside two woolen mills, twelve grist mills, an anchor forge, and a gin distillery.

William Almy of Providence wrote to his partner (Sept. 18), Samuel Slater, that Georgia cotton was growing more plentiful. He had received several invitations from New York to purchase a quantity there which was represented to be good and cheap. They then paid one shilling six pence per pound for cotton.

Considerable quantities of cotton were at this time still imported from the West Indies. The total importation of that article for the fiscal year was 4,106,793 pounds, and the exports 6,276,300 pounds.

The first cotton mill in Delaware was about this time put in operation by Jacob Broome at Wilmington, in the Old Academy on Market street. It was afterward removed to the Brandywine to be driven by water, but was soon after burned down.

Paper had been extensively manufactured for several years about one mile from the town, on the Brandywine, by Messrs. Joshua and Thomas Gilpin, and Myers Fisher, merchants of Philadelphia and proprietors of large flour mills at the same place. Their paper manufacture was about this time greatly extended on account of the interruption to the neutral trade with Europe.

December.—The Alleghany lumber trade, a valuable branch of the business of Pittsburg, was commenced by Mayor Craig, who purchased a large quantity of boards for the public service from Cornplanter, the Seneca chief, who had a saw mill at Genesadaga, on the right bank of the Alleghany, four miles below the State line, upon a portion of the Alleghany reservation of the Senecas.

The fourth Congress, soon after assembling, instituted for the first time a Standing Committee of Commerce and Manufactures. It had charge of those subjects during the next twenty-four years, when the duties were consigned to separate committees.

The Act of Parliament of 1786, prohibiting the exportation of tools and machinery used in the iron and steel manufactures, was made perpetual by the statute 35 Geo. 3 c. 38. It recapitulates the several descriptions of machines, engines, implements, utensils, and models, or parts thereof, employed in rolling, slitting, pressing, casting, boring, stamping, piercing, scoring, shading or chasing, and die-sinking iron and other metals. It included machines used in the button, glass, pottery, saddle and harness, and other manufactures, wire moulds for paper, etc. It proved afterward, as it had before, extremely embarrassing to new branches of manufactures in the United States.[1]

Among other patents issued this year was the first one to Jacob Perkins for cutting nails (Jan. 16), and one to Josiah G. Pierson of New York (March 23), for the same purpose, which was soon after put in operation at the Ramapo works of the patentee in Rockland county. Nautical ventilators for ventilating the holds of ships, patented (June 19) by Benjamin Wyncoop, were approved of by a number of leading shipmasters in Philadelphia, as a very useful invention.

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(1) Pope's Laws of the Customs and Excise.

Philadelphia held communication with neighboring cities and towns by the following modes of transportation, viz.: with New York by four daily stages, at the hours of four, five, six, and eight o'clock, A. M., and a line of packet boats to Burlington or Bordentown, thence by stage to Amboy and by packet to New York: with Baltimore by daily stage and a mail carriage tri-weekly, and by packet and land carriage combined (occupying two days in the route) six times in the week; with Lancaster and Burlington by stage twice a week; and with Bethlehem, Wilmington, Dover, Harrisburg, Reading, and Easton, each, once a week by stage.[1] 1796

A census of Pittsburg, giving the first authentic statement of its population, made it 1395. It was incorporated as a borough in 1794.

The excise duty on snuff manufactured in the United States continued to give dissatisfaction, and petitions were sent into Congress from many of the manufacturers, complaining of the inequality of its operation since the transfer of the duty to the mortar and mill without reference to the quantity made. Difficulty was found in dealing with the question consistently with the interests of the public and the manufacturer. The drawback of six cents a pound enabled some large manufacturers to realize fortunes, and more was paid in that way than was received for duties. The gross amount of duties was about $20,000 in the last year, and the drawback allowed was $25,000. Frauds were practiced by the use of hand mills which made no noise and escaped the tax. The amount exported in a year before the tax was estimated at 100,000 pounds. To tax this amount without allowing a drawback was unjust and impolitic. It was stated that one mill near Newcastle, Del., belonging to Mr. Jones of Philadelphia, made 11,000 pounds of Scotch snuff a month, or 500,000 pounds yearly, which, supposing his tax to be 2,240 dollars, reduced the duty to one cent a pound. Another had drawn large sums from the treasury in drawbacks. These large concerns, which had been built up in dependence on the continuance of the drawback, would be ruined by withholding it. To lay a duty of three cents a pound on Scotch snuff and allow an equal amount to be drawn back on exportation, still allowed too much to those who paid no duty. Many small manufacturers had given up the business because they could not obtain licenses for less time than one year. An act was finally passed suspending the act of March 3, 1795, until the next session of Congress. It was again suspended by later acts until April 24, 1800, when it was repealed.[2]

By an act of the same date distillers who were unavoidably prevented from

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(1) Philadelphia Directory, 1796.

(2) Laws United States. American State Papers.—Seybert, 469.

working their stills throughout the year, were permitted to pay a monthly duty of ten cents a gallon on the capacity of their stills in lieu of fifty-four cents yearly.

In the year ending 30th June, 1,475,509 gallons of spirits were distilled in Massachusetts from foreign, and 11,490 gallons from domestic materials, yielding a revenue of $148,769.36. The sum paid from the United States treasury for drawbacks on spirits exported this year amounted to $117,014.98.

In June, Philip Henri Neri de Tot Bastrop, a Dutch nobleman residing in Louisiana, was granted by the governor-general, the Baron de Carondelet, a tract of land twelve leagues square for an extensive agricultural colony, on similar terms with the grant to M. de Maison Rouge in the last year. He was required to introduce not less than 250 families, allot 400 acres of land to each, and erect upon the bayous, mills for the manufacture of flour for exportation. The grant was laid out on the bayous Siard Berthelemi and the Wachita, including the rich elevated prairie and the sugar and cotton lands of the garden of the Wachita. Bastrop fulfilled his contract so far as he was able, but the failure of the government to complete its engagement caused the abandonment of the enterprise after the transfer of the province to the United States on 30th April, 1803.

In August another grant of 458,963 acres on the western bank of the Mississippi, now partly in Missouri and partly in Arkansas, was also made by the Spanish government to James Clamorgan, a merchant of St. Louis, for the purpose of establishing a rope manufactory to supply the Spanish navy and the Havanna with cordage. Cultivators of hemp were to be introduced from Canada and instructed in the manufacture. This enterprise was not carried out until the transfer of the province.

The first successful attempt to manufacture sugar from the cane in Louisiana was this year made by M. Etienne Boré, at his plantation, a few miles above New Orleans, where Carrollton now stands. On the failure of his indigo crop in 1792 he had turned his attention to the sugar cane. He bought canes of a man named Mendez, who had made a few barrels the previous year, and contrary to the strong advice of his friends laid out a considerable plantation. He employed, at a salary of $1500 a year, a practical sugar maker named Morin, who had learned the business in St. Domingo and had superintended Mendez's operations, to build and put in operation sugar mills similar to those in the island. He was partially successful in 1795, and completely so in the present year, having sold his crop for $12,000, then considered a large sum. A large and curious but doubting assemblage collected on the day appointed for the experiment. The announcement made to them on the second strike, "Gentlemen, it grains, it grains!" was enthusiastically repeated, and proved not only a gratifying triumph to the persevering planter, but an important epoch in the industrial history of the state. The business of sugar making may be considered as established from that date, though not much progress was made for some years.

One or two varieties of cane only were cultivated at that time: the common Creole or Bengal cane, introduced in 1751 from Hispaniola, and the Otaheite, naturalized in this or the following year. Both of these afterward gave place, in a measure, to the Bourbon and red or purple ribbon cane, a native of Java.[1]

The Chinese sugar cane was this year introduced into British India by Earl Cornwallis.

During this summer a company of fifty shareholders was formed to erect a furnace, and manufacture salt on a small scale on the Muskingum, about seven miles above Duncan's Falls, where salt springs were found the year before. Kettles were bought at Pittsburg and carried by water to the Falls, thence by pack-horses to the licks. A well was dug, in which

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(1) De Bow's Industrial Resources, vol. 3, p. 275; Commercial Review, vol. 22, p. 618; Gayarre's History of Louisiana. Father Hennepin, in the seventeeth century, saw an indigenous sugar-cane growing near the Mississippi. The Malabar, crystalline or Creole variety above mentioned was sent in April, 1751, in a transport from St. Domingo, by the Jesuit fathers of Port au Prince, to their fraternity in New Orleans, along with a few negroes acquainted with its cultivation and the manufacture of sugar. As early as 1518 there were twenty-eight *ingenios* or sugar mills in that island. The reverend Fathers planted the canes in their spacious gardens above the town, near Canal street, now in the first district of the city. In 1754 they made an unsuccessful attempt to produce sugar. In 1758 a wealthy and enterprising planter built the first sugar house and mill in the colony, below the town now in the Faubourg Marigny, and attempted the business on a larger scale, but not very successfully. In 1764 the Chevalier de Mazan sent to Spain, from his plantation on the opposite side of the Mississippi, some sugar, pronounced by courtesy equal to the Muscovado of St. Domingo. The yield was said to be three thousand pounds to the acre. The next year the French Colonial Treasurer Destrehan and others, erected works like those of Dubreuil, and the first by the Spaniards on the left bank of the river. But in 1769 all attempts were abandoned. The exports of the city at this time were lumber, indigo, peltries, tobacco, tar, rice, corn and cotton. Dubreuil had some years before invented a machine for cleaning cotton (see vol. 1, p. 351), and was now the richest planter in the colony. He had five hundred slaves, a brickyard, an indigo plantation, a nursery for silkworms, and gathered annually eight to ten thousand pounds of vegetable or myrtle wax from the *Myrica Cerifera*, of which he had several nurseries. No other attempts were made with sugar for nearly twenty-five years. In 1790 M. Solis, a Spaniard, at Terre Boeuf, cultivated the cane for making *tafia* or rum from the juice, which sold readily. But he had failed in making sugar. In 1791 he sold his lands and apparatus to A. Mendez, who employed Morin, as stated in the text, to make and even refine sugar. He presented some diminutive loaves, one of which would sweeten two cups of coffee, to the Spanish intendant. Vines were purchased of him by M. Boré, who made the next and most successful experiment.

was inserted a hollow tree to exclude fresh water, and the brine was raised by a sweep and pole, worked day and night by successive relays of men. About one hundred pounds of salt were made every twenty-four hours, at a cost of at least three dollars per bushel. It was very dark and inferior in quality, being much impregnated with chloride of lime. Every fifty pounds required eight hundred gallons of water to be evaporated. This was the first salt made in the Muskingum valley. The furnace consisted of two ranges of twelve kettles each. The saline was forty miles from Waterford, from which, during the winter, provisions were packed on horses, and salt sent to the settlements in the same way. After three or four years the springs passed into other hands and finally to the state, which leased them at a fixed rate.[1]

During this year also the Ohio valley first began to be supplied with salt from the Onondaga salines through the enterprise of General O'Hara, who, in connection with Major Craig, also made arrangements for the erection of the first permanent glass works in Pittsburg.[2]

The first paper mill west of the Alleghanies was put in operation four miles east of Brownsville, Fayette County, Pennsylvania. It was the "Red Stone Paper Mill," and was erected by Samuel Jackson and Jonathan Sharpless, two ingenious mechanics of the Society of Friends, who had been raised near the extensive paper mill of the Gilpins on the Brandywine. Brownsville (Red Stone Old Fort) then contained twenty-four grist, saw, oil, and fulling mills. A profitable business was done in building Kentucky boats, which were constructed annually to the number of one hundred of twenty tons each, for the transportation of emigrants to Maysville and other points in Kentucky.

Discrimination was first made at the Treasury Department in the value of domestic and foreign merchandise exported. The total value of exports reached the sum of $67,064,097, an increase in five years of $48,052,056. Of the total, $40,764,097 was from domestic produce and manufacture. The imports amounted to $81,436,164.[3]

Gaslights were made and exhibited by Peter Ambrose & Co., manufacturers of fire-works, at their amphitheatre in Arch street above Eighth, Philadelphia. The inflammable air issued from orifices in bent tubes in figures of an Italian parterre, masonic emblems, etc.

John Fitch navigated a yawl by steam, with a screw propeller, on the Collect or Fresh Water Pond, north of the present City Hall in New York.

Robert Fulton, residing in England as an engineer, published in

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(1) Hildreth's Pioneer History of the Ohio Valley, p. 476.

(2) See vol. 1, pp. 248. 293.

(3) Seybert, p. 466.

London a Treatise on the Improvement of Canal Navigation, quarto, illustrated by seventeen plates and a portrait. His plans were strongly recommended by the British Board of Agriculture, under the presidency of Sir John Sinclair. On this subject, which chiefly engaged his attention at this time, he contributed some essays in 1795 to the London Morning Star, and sent copies of his writings to the United States, setting forth the advantages of canals. He obtained a patent from the British government for canal improvements and soon after went to France to introduce them there.

The manufacture of printing types was about this time permanently established in Philadelphia by Messrs. Archibald Binney and James Ronaldson, who soon after introduced the hand mould, since known in Europe as the American, the greatest improvement made since the invention of the art. It enabled a man to cast six thousand types in a day, instead of four thousand as by the old process. The success of the proprietors was decisive.

Eleven patents, out of the total number of forty-three, were this year granted for improvements in the manufacture of nails and brads, the greater part of them relating to the cutting and heading of nails by machinery. The first patent recorded for a machine combining those operations, was taken out by Isaac Garretson of Pennyslvania (Nov. 16); and was followed by another for the same process, to George Chandler of Maryland (Dec. 12). Daniel French, of Conn., patented (Dec. 23) improvements in the manufacture both of cut and wrought nails. Oliver Evans patented (May 28) an improvement in burr millstones, of which he was one of the earliest manufacturers in the country. Four patents related to the manufacture of leather, including one for making sumach, and one to James Stansfield (Nov 16), for an improvement in splitting sheep skins, the first of that kind on the records. Of the same date, was a patent to the English engineer, Mark Isamlard Brunel, for a method of ruling books and paper; and one to Apollos Kinsley of Conn., for an improvement in the printing press, which has since been the subject of over 100 patents in America.

Samuel Lee, Jr., of Conn., also received (April 30) a patent for the "Composition of bilious pills," the first of that class of inventions. Lee's Windham pills, and Lee's New London pills, the subject of three or four patents by him and his son S. H. P. Lee, were highly popular for a long period.

Another invention of the empirical class, which created much sensation for several years, was a method of "removing pains, etc., by metallic points," commonly known as the "*metallic tractors;*" patented by Elisha Perkins of Connecticut, Feb. 19th. It was a kind of galvanic application, for curing disease by the use of steel and brass points. The delusion of Perkinism extended even to Europe; but the author of it, who also invented an antiseptic medicine, fell a victim to misplaced confidence in his own nostrums, while combating the yellow fever in New York, in 1799. But his son established, in London, a Perkinean institution for the benefit of the poor, under the presidency of Lord Rivers. The tractors soon fell into neglect, but were the occasion of a very clever satire entitled "Terrible Tractoration, a Poem by Christopher Caustic," published in London in 1803, and written by an American.[1]

The impulse given to agriculture at this time, attracted much attention to labor-saving machines, applicable to the principal staples of the country. Several machines for threshing and cleaning wheat, rice, and other grains, and inventions connected with flour-mills, had already been patented. The success of Whitney had given a prominence to the cotton crop, and this year, three patents were granted for improvements in ginning cotton. The most important of these, was one issued May 12, to Hogden Holmes, who, early in the last year, appeared as a formidable contestant of Whitney's invention, which, until then, had only to contend with the *roller* gin. Holmes' machine was the same in principle as Whitney's, but had the teeth cut in circular runs of iron, instead of being made of wires, as was the case in the earlier forms of Whitney's gin. From this circumstance it was called the *saw* gin. It was the occasion of his principal law-suits afterward.[2] While embarrassed with

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(1) Cases of cures to the number of five thousand were published in England, with certificates from eight professors, forty physicians and surgeons, and thirty clergymen. The tractors were much ridiculed by the medical profession, and their popularity was short lived. In 1801, Thomas Green Fessenden, of N. Hampshire, the author of the poem referred to, visited London to introduce a new hydraulic machine. Not succeeding in his object, he produced, under circumstances of much pecuniary distress, the "Terrible Tractoration," in relation to Perkins's tractors, and its success was so complete as to relieve its author, and give occasion for several editions in England. It was enlarged and reprinted in this country, in 1806, as "The Modern Philosopher," and in another edition before his death in 1837.

(2) Whitney afterward proved, that the idea of teeth instead of wires had early occurred to him. That the principle was the same in both, was ingeniously demonstrated by Whitney at one of the trials, by sinking the plate below the surface of the cylinder, so as to make the saw teeth look like *wires*; and preparing another cylinder, in which the wire teeth were made to look like *saw teeth*. When produced in court, the witnesses swore the *saw* teeth upon Whitney, and the wire teeth upon Holmes; upon which the judge declared it was unnecessary to proceed any farther, the principle in both being manifestly the same. So inveterate was the purpose to defraud him, that, on a similar occasion, he had the greatest difficulty to prove in court, that the machine had even been used in Georgia, although at the same moment, three separate sets of the machinery were in motion, within fifty yards of the building in which the court sat; and so near, that the rattling of the wheels could be distinctly heard on the steps of the Court House. Few men in Georgia, at one time, dare testify to the

this new rival, and an evident general intention to invade his patent, and burthened with debt, Whitney arrived in New Haven about April 1795, to find himself reduced to bankruptcy, by the destruction of his shop and all his machines and papers, by fire only the day before his arrival. At the time the rival gin of Holmes was patented, Miller and Whitney had thirty gins in operation, at eight different places in Georgia; some carried by oxen or horses, and some by water; and about $10,000 invested in real estate connected therewith. While endeavoring to borrow money at twelve per cent. their operations were nearly brought to a stand, by reports from London, that the staple was greatly injured by the machine, a judgment which was soon reversed. Through these and similar difficulties, the energy and confidence of Whitney enabled him to persevere.

Three patents were taken out by the ingenious Amos Whittemore, of Cambridge Mass., one of them for an improved self-acting loom for weaving duck, believed to be similar in principle to the power loom now in use.

President Washington, on meeting Congress for the last time, called their attention to the necessity of a naval force, to insure respect to a neutral commerce, and the desirableness of beginning, without delay, to provide and lay up materials for the building and equipping ships of war, in which the nation might proceed by degrees, as its resources rendered it practicable and convenient. "Congress," he observes, "have repeatedly and not without success, directed their attention to the encouragement of manufactures. The object is of too much consequence not to insure a continuance of their efforts, in every way which shall appear eligible. As a general rule, manufactures on public account are inexpedient. . . But to the extent of the ordinary demand for the public service, were they not recommended by strong considerations of natural policy, as an exception to the general rule? Ought our country to remain in such cases dependent on foreign supply; precarious, because liable to be interrupted? If the necessary articles should, in this mode, cost more in time of peace, will not the security and independence thence arising, prove an ample compensation?"

The President, in the same speech, again called the attention of Congress to the subject of a national university and of a military academy; and was the first to suggest, on that occasion, the importance of a

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simple facts within their knowledge, in reference to the machine. The issue of the first trial they were able to obtain early in the next year, contrary to the pointed charge of the judge and the expectation of the defendant, was given against them. A second trial could not be obtained, until their business had been nearly destroyed by surreptitious gins.—*Olmsted's Memoir.*

national Board of Agriculture, "charged with collecting and diffusing information, and enabled by premiums and small pecuniary aids, to encourage and assist a spirit of discovery and improvement." Societies of that kind, he observed, had been found to be "very cheap instruments of immense national benefits." He had, nearly three years before, communicated to Sir John Sinclair, the eminent agriculturist, the outlines of such an organization for the state of Pennsylvania, but feared the country was not yet prepared to sustain one with Congressional aid. A national Agricultural Society was not formed until 1809.

The Andersonian University at Glasgow, was this year incorporated, by the magistrates and council of that city. The bequest of Dr. Anderson provided for colleges of Medicine, Law, Theology, and the Arts. The last of these, under Dr. George Birkbeck—who, in 1799, was appointed to the chair of Natural Philosophy, and instituted a course of lectures to mechanics, on elementary science and philosophy—became the first practical school for the operative classes, and the parent of Mechanics' Institutes throughout the world.

Benjamin (Thompson) Count Rumford of Munich, a native of New England, presented $5,000 to the American Academy of Arts and Sciences, as a fund, the interest of which was to be given once in two years, as a premium to the author of the most important discovery or improvement in heat and light, in any part of America or its islands.[1]

Col. Matthew Lyon, who, in 1783, commenced the erection of mills at Fair Haven, Vt., had in operation, previous to this year, one furnace and two forges, one slitting mill, one printing office, one paper mill, (built in 1794,) one saw mill, and one grist mill. His printing was done on paper manufactured by himself, from the bark of basswood. He had emigrated from Ireland at the age of sixteen, and was sold in Connecticut for his passage.[2]

1797 One of the earliest manufactories in the United States, of any extent, for spinning and weaving flax, hemp, and tow, by water power, was that of James Davenport, put in operation with patent machinery within the last twelve months, at the Globe Mills, at the north end of Second Street, Philadelphia. It was visited, at the beginning of the year, by Washington and several members of Congress, who were highly pleased with the ingenuity and novelty of the machinery. The President in particular expressed a high opinion of the merits of the patentee, Mr. Davenport, and an earnest wish that a work so honorable to the infant manufactories of the Union, might be extended to different

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(1) Holmes's Annals.

(2) Hayward's Gazetteer of Vermont.

parts of the country. The labor was chiefly performed by boys; one of whom was able to spin, in a day of ten hours, 292,000 feet of flax or hempen thread, using twenty to forty pounds of flax or hemp, according to its fineness. One boy could also weave, on the machinery, fifteen to twenty yards of sail cloth in a day. Specimens of the spinning and weaving were deposited in Peale's Museum for public inspection. It was the purpose of the proprietor to manufacture the machinery for sale. But he died soon after, and the machinery of the Globe factory was sold in April, 1798, and the business broken up.

On the failure of a bill introduced in Congress, in accordance with the recommendation of the Secretary of the Treasury and a resolution of the House, and favored by the mercantile classes, to lay a direct tax on lands, houses, and slaves, in order to meet the demands upon the Treasury, the following additions were made (March 3) to the existing duties upon imports, viz.: On brown sugar, one half cent per pound; Bohea tea, two cents; molasses, one cent per gallon; on velvets and velverets, and muslins and muslinets, and other cotton goods not printed, stained, or colored, two and a half per centum *ad valorem*. The duty on the above descriptions of woven fabrics, was thereby made twelve and a half per cent. on the value, or the same as on printed and stained goods.[1]

By an act of the same date, option granted to the distiller by the law of 8th June, 1792, either to pay an annual duty of fifty-four cents per gallon on the capacity of the still, or at the rate of seven cents a gallon upon the quantity of spirits distilled, was withdrawn after 30th June. In lieu of the duty, he was thenceforth to pay for a license to use any such still for two weeks, six cents per gallon upon its capacity, including the head; for one month ten cents per gallon; for two months eighteen cents; and six cents per gallon additional for every additional month up to six months.[2]

On Jan. 14, Congress prohibited, until the end of the next session, the exportation of arms and ammunition, and allowed them to be imported duty free for two years. The prohibition was renewed at the expiration of the act, for another year.[3]

In July, duties were laid by Congress on stamped vellum, parchment, and paper, to commence 1st July, 1798, and continue until 4th March, 1803.[4]

An additional duty of eight cents per bushel (making it twenty cents) was imposed on salt imported in United States vessels, with an

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(1) Laws U. S., vol. 3, ch. 64.

(2) Ibid. vol. 3, ch. 65.

(3) Ibid. vol. 4, ch. 2.

(4) Ibid. vol. 4, ch. 11.

additional ten per cent. when brought in foreign vessels. An allowance of twelve cents per barrel on pickled fish exported, and an addition of thirty-three and one third per cent. to the allowance before granted to vessels in the bank or other cod fisheries, were also authorized. This law continued in force until April 12th, 1800, when the act of 1792 was revived for ten years, and the additional allowances authorized by it and by the above act, were continued only so long as the correspondent duties on salt, respectively for which they were granted, were paid.[1]

On June 20, the first laws were enacted in New York respecting salt works, and the first leases of lots at the Onondaga Salt Springs were made by the state, to manufacturers under a commissioner, who required them to make contracts at not above sixty cents a bushel, and to pay a duty to the state of four cents per bushel.

The city and suburbs of Philadelphia contained at this time, ten ropewalks, which manufactured about 800 tons of hemp annually; thirteen breweries, said to consume 50,000 bushels of barley yearly; six sugar houses; seven hair powder manufactories; two rum distilleries and one rectifying distillery; three card manufactories; fifteen manufactories for earthenware, six for chocolate, and four for mustard; three for cut nails and one for patent nails; one for steel; one for aquafortis; onef or salammoniac and Glauber's salt (which supplied the whole Union with the latter article); one for oil colors; eleven for brushes; two for buttons; one for morocco leather, and one for parchment; besides gunmakers, copper-smiths, hatters (of which there were 300 in the state, who made 54,000 fur, and 161,000 wool hats annually); tin-plate workers, typefounders, coach makers, cabinet makers, ship-builders, and a variety of others. The city contained thirty-one printing offices, four of which issued daily gazettes, and two others semi-weekly gazettes, one of them in the French language; besides two weekly journals, one of them in German. The other offices were engaged in printing books, pamphlets, etc. The catalogue of books for sale in the city, contained upwards of 300 sets of Philadelphia editions, besides a greater variety of maps and charts, than was to be found any where else in America.[2]

The United Brethren at Nazareth, Pennsylvania, had in operation a factory for spinning and twisting cotton, and had recently begun to draw wax tapers.

In the spring of this year, the "Hamilton Manufacturing Society," the proprietors of extensive glass works with hydraulic appurtenances, ten miles west of Albany on the great Schoharie Road, was incorporated by the state. The business was commenced about nine years before,

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(1) Ibid. vol. 4, ch. 15.

(2) Morse's Gazetteer, vol. 1.

and, under the patronage of the Legislature, at this time presented one of the most conspicuous examples of private manufacturing enterprise in the country.[1]

Robert Fulton, in company with Joel Barlow of Connecticut, then residing in Paris as a merchant, made experiments upon the Seine with a submarine vessel.

The first steamboat on the Hudson was this year built by Chancellor Livingston. A steamboat with paddle wheels at the sides, built at Bordentown, N. J., by Samuel Morey and Burgess Allison, was navigated to Philadelphia and back.

The first American vessel on Lake Erie, was the schooner *Washington*, built this year at Four Mile Creek, Erie, Pa. She was lost soon after, and the enterprise was not repeated for some time.

Three of the six frigates authorized by Congress, in 1794, were launched, and ordered to be manned and put in service. They were the Constitution, built at Boston, the United States at Philadelphia, each of forty-four guns, and the Constellation of thirty-eight guns, constructed at Baltimore. They were the first commissioned and afterwards the most conspicuous for their success of any in the naval serviee, and were the only naval force upon which the United States relied, in the unpleasant relations it then held with France, growing out of the numerous hostile decrees and predatory acts affecting the neutral commerce of the Union, which compelled the government to annul the infracted treaty with that power.

The emigration this year to western New York from Pennsylvania, Maryland, New Jersey and New England, exceeded that of any previous year. The Genesee country was already so far improved that the inhabitants lived in comfort and even luxury. When Messrs. Gorham & Phelps, in 1789, opened the first land office in the state, there was not a white inhabitant upon the tract. In 1793 there were at least six thousand, and it contained several grist and saw mills, flying stores, churches, and chapels. An academy for youth at Canandaigua was proposed within two years after the settlement. About three thousand emigrants arrived yearly, and the improvements were rapid, especially in regard to saw, grist, and merchant flouring mills, potash works, roads and bridges, etc. "The Bath Gazette" newspaper was started in 1796, and a sloop of forty tons was built about the same time to run as a packet between Geneva and Catharines Town on Seneca Lake. Her launching drew together for the first time the inhabitants of the country to the number of several thousand, who were mutually astonished at their own numbers. A press

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(1) See vol. 1, p. 240.

and weekly paper were the same year started at Geneva with eight hundred subscribers, who before six months increased to one thousand. Flax and hemp were cultivated on the Genesee Flats. Wheat and Indian corn were abundantly grown, and flour equal to any on the continent was made at numerous mills. From the apple and peach orchards of the Mohawk, fruit was supplied in great plenty. One farmer made in a season one hundred barrels of cider, another furnished a distillery with one hundred bushels of peaches, and a third sold cider to the value of twelve hundred dollars. A very considerable brewery was this year set up by a Scotchman at Geneva. Whisky, previously brought four hundred miles from Northumberland, Penn., and sold at one dollar and fifty cents per gallon, was now made in considerable quantity. Fifteen familes in No. 4, seventh range, made two tons of maple sugar in a season. During the following year a respectable mercantile house in Baltimore, built merchant mills at Tioga Point and established an extensive manufactory of cordage for ships from the hemp of the Geneva Flats. Arks for the transportation of lumber, flour, and other produce, were introduced about the same time. Few sections of the country have made more rapid progress in population and industry.[1]

Among the patents, about fifty in number, granted this year, the most important were those to Amos Whittemore (June 5), for an improvement in the manufacture of wool cards, and Benjamin Seymour (June 26), for rollers for slitting and other mills for rolling iron, both of which have been in extensive use to the present time. Eli Terry of Connecticut, the first extensive clock manufacturer in that state, received (Nov. 27) letters patent for an improvement in clocks, time-keepers, and watches. Several were granted for nailmaking, and for threshing, and other agricultural machines, and six for improvements in stoves, chimneys, and fireplaces. The last was by Charles Wilson Peale, the portrait-painter. He also patented an improvement in bridges, which were the subject of three other patents beside. One of these last was given to Timothy Palmer of Newburyport, Mass., who had previously constructed bridges over the Merrimack and other New England rivers, and afterward built one at Easton, Pa., and the Schuylkill Permanent Bridge at Philadelphia, which were all regarded as triumphs of engineering skill, and led to the general approval and adoption of his architectural principles.

1798 Eli Whitney, having abandoned all hopes of pecuniary advantage from the cotton gin, entered into contract with the United States government to make ten thousand stand of muskets at the price

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(1) Doc. Hist. N. Y., by O'Callaghan, vol. 2.

of $13.40 each; four thousand to be delivered on or before Sept. 30, 1799, and the remainder in one year from that time. He proceeded to erect a complete and extensive gun factory in the town of Hamden, a few miles from New Haven, where the village of Whitneyville now stands. In consequence of the works having to be constructed, machinery and tools made, and much of it invented, raw materials collected, etc., the contract was not finally closed until January, 1809, during which time his genius was so impressed upon every part of the works as to render it a model establishment for the whole country.[1]

A Society for the Promotion of Agriculture, Manufactures, and Arts, was established by the Legislature of New York.

The dismissal of American envoys from France, and other hostile decrees, produced great indignation and a disposition to vote "millions for defence, not one cent for tribute." For the protection of commerce, Congress authorized the President to cause to be built, purchased, or hired, not exceeding twelve vessels of twenty-two guns each. To carry the intentions of government into effect, with greater system, a new Executive Department, that of the navy, was established. Ten small vessels were authorized to be built, purchased, and fitted out as galleys. Armed vessels, offered by private persons on favorable terms, were to be accepted. A marine corps, consisting of the several grades of officers and privates, was established. Three additional ships of thirty-two guns each, were authorized to be built, for which $600,000 were appropriated.[2]

The manufacture of corn brooms, on a small scale, for the New York market, was commenced by the United Society of Shakers in Watervliet, N. Y., who began in 1791 to raise broom corn on the alluvial lands of the Mohawk. The handles were made of soft maple turned in a foot lathe, and the twine was wound upon the husk by means of a cylinder turned by a crank, while the handle was held in one hand and the brush in the other. This simple mechanism was afterward improved by adding a bench to the roller fitted to a frame in the bench, and a rag wheel to hold the cord when wound by a short crank as before. The brooms sold for fifty cents each, and two dozen a day was an achievement equal to seven or eight dozen at present. The original society at the Shaker settlement still carry on the business somewhat extensively, and all other societies of Shakers throughout the Union to a greater or less extent.[3]

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(1) See vol. 1, p. 516.—Olmsted's Memoir.

(2) Laws United States, vol. 4, chaps. 48, 52, 56, 81, 89, 99.

(3) Benjamin Atkinson, of Byberry township, now a part of the consolidated city of Philadelphia, about 1790, commenced the first domestic manufacture of brooms, from the pannicles of broom corn (Sorghum saccharatum), a plant said to have been first raised in this country by Dr. Franklin,

The President was empowered to purchase cannon, arms and ammunition, for which $800,000 were appropriated, or if more practicable he might lease for a term of years, or purchase in fee simple for the United States, one or more suitable places, and establish founderies and armories for the casting and manufacture of cannon and small arms, for which he was authorized to employ artificers and laborers under proper superintendents. An annual account of expenditures was to be laid before Congress. The armory at Harper's Ferry was established under this act, and the first muskets, to the number of 293, were made there in 1801.[1]

At the Springfield armory 1044 muskets were made this year. The number made in the three previous years were 245, 838, and 1028, respectively.[2]

To meet these expenditures a direct tax was for the first time laid by Congress (July 14), to the amount of $200,000, to be assessed upon dwelling houses, lands, and slaves, according to a valuation, ordered by a previous act. Dwellings were to pay from two-tenths to one per cent. on the valuation, and slaves fifty cents each, the balance to be assessed upon lands.[3]

On May 19, the armed national galley, President Adams, was launched at Pittsburg. The galley Senator Ross was then on the stocks, and the two were among the earliest sea-going vessels constructed on the Ohio. A brig of 120 tons, called the Arthur St. Clair, then building at Marietta by Commodore Preble, and launched the next year, is said to have been the first sea-rigged vessel from that river.[4] After going to Havana, she was sold in Philadelphia. The ship John Adams, of thirty-two guns, was built this year, at Cochran's ship-yard in Charleston, S. C., by Paul Pritchard.

The first American vessel built on Lake Ontario, the "Jemima," of thirty tons, was also launched from Hanford's Landing, three miles below Rochester.

The manufacturing town of Steubenville, on the Ohio, was laid out this year, by James Ross, Esq., of Pittsburg.

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from a single seed taken from an imported whisk, and planted in his garden. Mr. Atkinson raised the corn and made the brooms himself for four years, when he associated with Bezaleel Croasdale. They jointly supplied Philadelphia and neighboring towns, Baltimore, and occasionally New York, until 1815 or 1816, when others engaged in the business, in consequence of the high price of brooms during the war, when they sold for $4.50 per dozen. Their first manufacture were round, and secured at the neck by horn instead of twine, retained in its place by a wooden peg. The handles were of oak, rough shaved with a drawing knife. The business is still continued in the neighborhood.

(1) Ibid., vol. 4, chap. 55.

(2) Seybert, 627.

(3) Laws U. S., vol. 4, chap. 92.

(4) Craig's Hist. Pittsburg. — Brown's Western Gazette, 309.

The manufacture of straw plait or braid for hats and bonnets, was originated at this time, in Providence, R. I. Miss Betsy Metcalf, afterward Mrs. Baker, at the age of twelve years, without previous instructions, succeeded in making from oat straw, smoothed with her scissors and split with her thumb-nail, a bonnet of seven braids with bobbin inserted like open work, and lined with pink, in imitation of the English straw bonnets, then fashionable, and of high price. It was bleached by holding it in the vapor of burning sulphur. The article was much admired, and many came from neighboring towns to see it, and to order bonnets for themselves, at half the price of the imported. Young women were gratuitously instructed in the art by the inventor, and this laid the foundation of an extensive branch of business in Providence, Dedham, Wrentham, and other towns in New England and throughout the country.[1]

In June, 1798, Matthew Carey issued the thirteenth volume of the American Museum, a periodical which contributed much to the advancement of literature and manufactures in the United States. Twelve consecutive volumes were published between the years 1787 and 1792, but inadequate means compelled the editor, long a disinterested benefactor of the manufacturing classes, to discontinue it.

The Cyclopedia, in 18 volumes quarto, with numerous plates, the first of its kind in the United States, was also issued by Thomas Dobson of Philadelphia. Three additional volumes were afterward published.

The manufacture of dye stuffs was commenced in New York by the founder of the respectable house of William Partridge & Son, still engaged in the same business. Among the articles first introduced in this country by them, were lac dye, bichromate of potash, argal, peach and Nicaragua wood.

Mr. Tennant, of Glasgow, this year patented an improved method of preparing chloride of lime for bleaching, which had an important influence upon the cotton and linen manufacture.

Long cotton began first to be generally grown as a crop in South Carolina about this time.

Samuel Slater entered into copartnership with Oziel Wilkinson, whose

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(1) This traditional account of the humble but independent origin in the United States, of an art long practiced in Tuscany and other Italian states—but then of recent introduction in England, where it was the subject of a patent, in May, of this year, by Peter Boileau—was the subject of a confirmatory memoir, read by Judge Staples, author of the Annals of Providence, before the Rhode Island Society for the encouragement of Domestic Manufactures, Sept. 29, 1858, and published in the Society's Transactions. It is also authenticated by a letter written a few years ago by Mrs. Baker, who made a fac simile of the first bonnet braided by her, which was deposited in the Society's collections.

daughter he had married, and Timothy Green and William Wilkinson, also sons-in-law of the latter, under the firm name Samuel Slater & Co., Mr. Slater owning one half the stock. They erected on the east side of the Pawtucket river, a cotton mill, afterward known as the *New Mill*, which was the second built by Slater, and the first upon the Arkwright principle in Massachusetts. Both the old and new mills were superintended by Slater, who received a compensation of $1.50 per diem from each, and by his laborious and constant personal attention, overcame the numerous difficulties attending first enterprises.

The hands in this mill soon after revolted, and five or six of them went to Cumberland and erected a small mill, owned by Elisha Waters and other persons, named Walcot. By these men and their connections several factories were commenced in various parts of the country; most of the establishments erected from 1790 to 1809 having, in fact, been built by men who had directly or indirectly derived the knowledge of the business from Pawtucket, the cradle of the cotton manufacture. Slater's patterns and models were stolen by his servants; his improvements thus became extended over the country, and the business was rapidly introduced in other places.[1]

The large Ramapo or Pierson's Iron works on the Ramapo river in Hampsted, Rockland Co., New York, were put in operation this year by J. G. Pierson & Brothers. They consisted of a forge, rolling and slitting mills, works for cutting and heading nails by water, saw and grist mills, etc.[2] The nail machine was patented by J. G. Pierson in March 1795.

John Fitch navigated a model steamboat at Bardstown, Kentucky. The Legislature of New York had repealed, in March, the law granting special privileges to Fitch, and transferred them to Robert R. Livingston for twenty years, on condition that he should within twelve months build such a boat to go four miles an hour. The unfortunate inventor of the steamboat, having previously tried his fortunes unsuccessfully in Europe, died in the course of the year at Bardstown, while prosecuting his claims to lands purchased in Kentucky, many years before, and just as a brighter prospect was dawning upon him. In conformity to his wishes he was buried on the shores of the Ohio, that he might repose "where the song of the boatman would enliven the stillness of his resting place, and the music of the steam engine soothe his spirit."

Experiments in steam navigation, with a boat of thirty tons, were made near New York by Nicholas I. Rooseveldt and Robert R. Livingston, soon after the partner of Robert Fulton, who during the year pro-

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(1) Memoir of Slater.

(2) Spafford's Gazetteer of N. Y.

posed to the Legislature of the state to propel a vessel by steam on new principles, if assured of its exclusive advantages when successful.

Rooseveldt, in connection with James Sullivan, took out a United States patent (May 31) for a double steam engine, and soon after constructed probably the first effective steam engine, after those of Fitch, ever built in America. He completed one in 1800, with a wooden boiler, through which long cylindrical flues or heaters wound several times before entering the chimney. It was for the use of the Philadelphia water works, for which he constructed two double engines, and contracted to supply three millions of gallons of water daily if required, with the privilege of using the surplus power of the lower engine on the river Schuylkill for various manufacturing purposes.

A steam saw mill, the first recorded, was patented by Robert McKean (March 24). David Wilkinson, an ingenious and enterprising machinist of Pawtucket, who rendered Slater and the early cotton manfacturers much service, patented a screw cutting machine, afterward operated by water power at Pawtucket Falls.

Seven or eight patents were given for hydraulic machinery of different kinds, for which the demand was becoming extensive, including a machine for raising water by M. I. Brunel.

In December, Hon. Hugh Orr, for over half a century an ingenious and enterprising mechanician of Bridgewater, Mass., who made the first muskets, and bored cannon, and the first cotton machinery in this country, died at the age of eighty-two.

1799 Amos Whittemore visited England, for the purpose of securing a patent for his card machinery. On his return the same year, he formed a partnership with his brother and Robert Williams of Boston, under the firm style of Williams, Whittemore & Co., and commenced the manufacture at West Cambridge, where the business has been carried on by the family of the inventor, nearly or quite to the present time. They were soon able to finish 200 dozen pair per week.

The sales of cotton yarn had at this time become sufficiently promising to induce another company to set up a cotton mill in Rhode Island; and Messrs. Almy, Brown & Slater, made considerable addition to their "old mill." Their investments during the next seven years, were more particularly in the business of spinning, and it was thenceforth continually on the increase.

Robert Fulton this year introduced into Paris the first panoramic painting, aided by optical illusions, ever exhibited in that city.[1]

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[1] See vol. 1, 289-90.

The patents issued this year, included one to Mark Isambard Brunel, for a machine for writing with two pens (Jan. 17); to John Sears, for a machine for manufacturing salt (Jan. 24). The patentee was an enterprising salt manufacturer of Cape Cod, Mass. One to Benjamin Dearborn, for his celebrated steelyards or Patent Balance (Feb.14); to Jacob Perkins, for an improvement in making nails (Feb. 14); and one to the same, for a check to detect counterfeits (March 19). Both of these last were valuable inventions; to Benjamin Tyler for a flax and hemp mill (Feb. 26); to Charles Whiting of Mass., for extracting oil from cotton seed (Mar.2);[1] and to Robert R. Livingston of New York, for manufacturing paper.

As this year closes the century, it may be proper to give a brief summary of the state of commerce in the country.

The total value of the exports of the United States for the year, was $78,665,522, of which $33,142,522 was the growth, produce, or manufacture of the Union. The total value of the imports was estimated at $79,069,148.

New York this year, first took the lead of other states in the amount of its exports, which were $18,719,527. The other states ranked in the following order, as to the value of their exports; Maryland, Pennsylvania, Massachusetts, South Carolina, Virginia, Georgia, Connecticut, Rhode Island, North Carolina, New Hampshire, Delaware, Vermont,

(1) In 1769-70, Dr. Otis, of Bethlehem, Pa., presented to the Am. Philosoph. Society, through Dr. Bond, a sample of oil made from hulled cotton seed. It was made,—as were specimens of the oil of sunflower seed exhibited at the same time,—by the Moravians at that place, and in much the same way as linseed oil, at the rate of nine pints of oil to a bushel and a half of seed. It was said to be used medicinally in the West Indies.—*Phil. Trans.* vol. 1. The London Society of Arts, in 1783, having learned that cotton seed yielded oil seed cake as food for cattle, in order to encourage the cultivation of cotton, offered a gold medal as a premium for oil expressed from cotton seed, and oil cake from the remaining seed, made by planters in the British West India Islands, in quantities of not less than one ton of oil and five hundred weight of cake. A silver medal was offered for smaller quantities, and the premiums were annually renewed for six years. But the large quantity required appears to have defeated the object. A medal was offered by the S. C. Agricultural Society soon after its organization in 1785, for oil from cotton seed and other oleaginous seed. Patents were taken out in 1819, by Daniel Gillett of Springfield, Mass., for preparing food from cotton seed, and the next year by Geo. P. Digges of Virginia, for extracting oil from the seed. But it is only within a few years that a new source of profit to the Southern cotton planter, has been found in the manufacture of oil and seed cake, from the thousands of tons of seed which annually encumbered the estates, or was used on the poorer soils as manure. The saving to be thus effected has been differently estimated at from twenty to thirty millions of dollars annually. Some sixteen or more patents have been taken out, for machines for hulling the seed for that purpose.

New Jersey. The exports from Vermont were $20,480, and were the first from that state of which returns were made.

The average annual exports of flour from the United States during the last five years, were 596,140 barrels; of potash 4,627 tons; of pearl-ash 2,024 tons; of tobacco 74,100 hogsheads; of tar 52,712 barrels; of pitch 7,145 barrels; of rosin 9,802, and of turpentine 43,696 barrels. The average yearly value of all domestic articles exported in the same period, was $32,822,965.

The exports from the United States to Louisiana and the Floridas, were $3,504,092, of which $447,824 were domestic articles. The imports from the same were $507,132. St. Genevieve and New Bourbon, in Upper Louisiana (now Missouri), produced 170,000 pounds of lead, of which 36,000 pounds were sent to New Orleans. The population of St. Louis was 925.

The total tonnage of every description belonging to the Union, was 946,408 tons, of which 669,197 was registered tonnage engaged in the foreign trade, 220,904 enrolled in the coasting trade, and the balance was enrolled and licensed tonnage employed in the coasting trade and fisheries.

CHAPTER II.

ANNALS OF MANUFACTURES.

1800—1810.

DIRECTING our attention, first to those acts of legislation, which may be said to have had a direct or indirect bearing upon manufacturing industry, we note, that on Feb. 28, Congress passed an act, providing for the second census of the inhabitants of the United States, to commence on the first Monday in August. The returns gave the total population of twenty-one states and territories, as 5,319,762, of which number, 896,849 were slaves.

1800

In April, the law relating to Patent Rights, was modified so as to restore to aliens, who had resided two years within the United States, all the rights and privileges enjoyed by citizens, under the act of 21 Feb., 1793. The legal representatives of a deceased inventor, were empowered to receive a patent. The violation of the rights of patentees was made punishable, by a forfeiture of three times the amount of the damages.

The quantity of spirits distilled in the United States from foreign materials (chiefly in the Eastern States), during the year, was 1,290,476 gallons, and from domestic materials 51,625 gallons, on which the gross amount of duties was $142,779. The aggregate capacity of all the stills employed, was 2,084,212 gallons; upon which the aggregate duty was $372,561. The total quantity of spirits distilled from molasses since Jan. 1, 1790, was 23,148,404 gallons, of which 6,322,640 gallons were exported.[1]

The quantity of refined sugar sent out of the refineries during the year, was 3,349,896 pounds, and the gross amount of duties thereon, was $66,998.[2]

The quantity of cotton grown in the United States this year, was about 35,000,000 of pounds, of which 17,800,000 were exported. Of this, about 16,000,000 of pounds went to England, constituting over one-fourth of the total importation of cotton into that country. The quan-

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(1) Seybert, 261, 461.

(2) Ibid, 470.

tity manufactured in the United States, was upward of 8,000,000 pounds, of which, only about 500 bales were consumed in regular establishments.[1]

The caterpillar or cotton-worm, first commenced its devastations in South Carolina.

The first cotton-spinning machine in France, was this year introduced from England, through Ghent, and was presented to the first consul. It was, about the same time, introduced for the first time into Switzerland, in the canton of St. Gall, where it was followed the next year by the power loom, recently brought into general use in England. Machine spinning was introduced into Saxony the year previous.

The price of cotton twist in Rhode Island, was as follows: for number 12, 103 cents; number 16, 119 cents; number 20, 136 cents; an increase of fifteen cents on the prices of 1794.

The manufacture of morocco leather was about this time commenced, at Lynn, Mass., by William Rose, an Englishman, who had been regularly bred to the business in London. His dwelling and manufactory, occupied the present site of the grounds and residence of Stephen Oliver, Jr. His success was great, but through imprudence he became bankrupt in about eight years; and in 1809, resumed the business in Charlestown, where it had been previously revived since the Revolution,—about the year 1796,—by Elisha Mead. In the following year he removed to Northampton, Connecticut, which he left in 1814, and four years after, died in poverty, at Sterling, Mass. The morocco business in Lynn, was successively prosecuted by Joshua R. Gore, Francis Moore & Henry Healy, Wm. B. & Joshua Whitney, Carter & Tarbell, Samuel Mulliken, Daniel R. Witt & Joseph Mansfield; who were the principal manufacturers during the ten years after Rose left. The apprentices of the latter introduced the business in several other towns.

The Salem Iron Manufacturing Company, in Mass., was incorporated with power to hold real and personal estate, to the value of $330,000. A rapid increase in the production of iron commenced about this time in England, which this year made 180,000 tons.

The building of vessels was commenced at Elizabeth, on the Monongahela river, sixteen miles above Pittsburg, by Col. Stephen Bayard, who laid out the town in 1787; and at this time took out a company of ship carpenters from Philadelphia, and established a ship-yard. The first vessel built was the ship Monongahela Farmer.

(1) Claiborne's Report to Commissioners of Patents, 1857.

Patents were this year granted to Oliver Evans (Jan. 16), for an improvement in stoves and grates. This was for the luminous stove, with doors or lights of talc, and designed for burning the recently discovered hard Lehigh or stone coal, which could not be burned in common stoves. His grate stoves are believed to have been the first to come into general use, and were the first in which talc was used. John G. Gebhard, of N. Y., received a patent (Feb. 4) for extracting oil from Palma Christi.[1] John J. Hawkins, of Philadelphia, patented (Feb. 12) an improvement in the piano-forte, which he manufactured and sold, at fifteen South Second st., under the name of Patent Portable Grand Piano, as his card states, at little more than half the price of imported grand or square pianos. He also manufactured a patent ruling machine; and later in the year, took out another patent, for an improvement in musical instruments. John Biddis, who had before received two patents for improvements of a chemical nature, was granted one (May 6) for an engine for reducing silk, cotton, worsted, cloth, etc., to their original state, to be manufactured. This was a very early attempt to utilize such refuse materials, which, by the aid of modern machinery, now form the basis of an extensive manufacture of *shoddy* in England, and to some extent in this country, and which has materially affected the production of woolen goods in the United States. Peter Lorillard, of New York, patented (June 28) a machine for cutting tobacco, of which he was an extensive manufacturer. Jonathan Grant, Jr., of Belchertown, Mass., filed (Oct. 4) the description of an improved telegraph. This invention, made two years before, was put in operation between Boston and Martha's Vineyard, a distance of ninety miles, and a question was transmitted and answered in less than ten minutes.[2]

In February, Henry Wiswell, Zenas Crane, and John Willard, of

(1) The manufacture of castor-oil, from the castor-oil bean or palma christi, the *Ricinus Communis* of Linnæus—which is now extensively prosecuted in several parts of the Union, particularly in the Western States—employed one or two mills in New York, as early as 1789. The Agricultural Society of South Carolina, soon after its incorporation in 1785, offered among other premiums, medals, for the largest quantities of oils from the olive—cuttings of which they distributed—from ground nuts, sesamum or bene seed, cotton and sunflower seeds, and for castor oil. The palma christi or castor nut, grew abundantly in the state, and yielded from 100 to 150 gallons of oil to the acre. A Mr. Rudolph, of Camden, a few years after the date in our text, had fifty or sixty acres under cultivation with the plant, from which he had produced large quantities of cold drawn oil by expression. It was first extensively manufactured in the United States, some years later, at Newbern, in North Carolina. In quality, American castor oil is equal to the best East Indian.

(2) Holmes's Annals.

Dalton, Mass., proposing to erect a paper mill at that place, issued an 1801 earnest appeal to the ladies of Berkshire, to save their rags. They built the first paper mill in the county, which went into operation the next year, and is now known as the "Old Berkshire" mill. They made about twenty tons of paper annually, until 1807, when Wiswell and Carson became the managers until 1810, since which time, it has been run by David Carson and his sons. In 1855, this mill made 180 tons of paper yearly, worth twenty cents a pound. It employed sixty hands, having been much enlarged by its present owners.[1]

A blast furnace, erected about 1786, near the Chicopee Falls, by James Byers and William Smith, this year passed into the hands of Benjamin Belcher, of Easton, and Abijah and Wm. Witherill, who built a foundry and enlarged the business. In 1805, Mr. Belcher purchased the right to the whole, and continued the business until 1822, when he sold the land and water privilege, on which the extensive manufacturing village of Chicopee Falls now stands, the iron business having been still conducted by his sons until 1846. Some castings are yet made there.[2]

Robert Fulton, having for several years pursued his experiments with a submarine boat, and had his plans twice rejected by the French Directory, and also by the British Government, descended in the presence of commissioners appointed by Bonaparte, with three men, in a plunging boat in the harbor of Brest, to the depth of twenty-five feet, and remained one hour. His vessel was capable of sailing like a common boat on the surface, and, after striking her mast, could be made to dive and be moved in any direction under water at the rate of about three miles an hour. He also blew up a small vessel in the harbor with a submarine bomb containing twenty pounds of powder, and made various other experiments at Brest and Havre with diving boats, with a view to having them employed by the government against the enemy's shipping. He was unsuccessful, and in 1804 repeated his experiments in England, where on the 15th Oct., 1805, he blew up a strong Dutch brig of 200 tons, in Walmar Roads, but fortunately did not succeed in introducing into the naval appointments of the nation so destructive an agency. In December of the following year he returned to America, where his genius found its greatest triumph in the achievement of steam navigation.

The ship Benjamin Franklin arrived at Philadelphia bringing Don Pedro, the first full-blooded Merino buck imported into the United States. He was one of four lambs, shipped in the same vessel, the others having perished during a boisterous passage. They were selected at the request

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(1) Holland's Western Mass.

(2) Ibid.

of M. Dupont De Nemours, who accompanied them, by M. Delessert, a banker of Paris, who was at the head of a commission to select in Spain on behalf of the French government, a flock of 4000 merino sheep out of the number of 6000, which Spain had stipulated by the treaty of Basle to present to France. Two of the sheep were intended for Rosendale, the farm of M. Delessert at Kingston, on the Hudson, one for M. Dupont's place near New York, and one as a present to Mr. Jefferson at Monticello. Don Pedro was kept as a stock ram, first by Mr. Dupont and afterward at Rosendale, when he was sold, with the rest of Mr. Delessert's flock, at public auction, in 1805. He was purchased by Mr. Dupont for sixty dollars and transferred to the farm of E. I. Dupont, near Wilmington, Delaware, where the farmers were offered the use of him gratis. Fine wool sheep were thus multiplied in the neighborhood by Mr. Dupont and others, and soon after Dupont & Co. erected works for manufacturing fine wool. His progeny in New York were scattered among the farmers, who knew little of their value until Chancellor Livingston, who purchased many of the ewes to cross with his Rambouillet stock, imported in the mean time, taught them how to appreciate the breed.

Dr. James Mease, of Philadelphia, in 1796–7 sent two orders for merino sheep, and had one shipped to him which was washed overboard, in a storm at the capes of Delaware, and this year sent another order to Yznardi, the son of the American Consul at Cadiz, by whom two rams and two ewes were shipped, which arrived in Dec. 1803.[1]

Arthur Scholfield, of Pittsfield, Mass., who accompanied Samuel Slater from England, and, in 1793, was concerned in starting the first incorporated woolen factory in the United States, at Byfield, in Newbury, completed the first improved carding engine in New England. The machine was constructed without the aid of patterns or drawings, which the laws of England did not suffer him to bring away. During its construction the builder is said to have been obliged to make one or two voyages to England, to refresh his memory of the parts, and to have smuggled portions of the machine, or models and plans, concealed in his

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(1) Mease's Archives of Useful Knowledge, vol. 1, p. 103. This appears to have been the first introduction of Spanish sheep, attended with any practical result. In a letter of Robert Morris, dated Oct. 30, 1789, reference is said to be made to two sheep, sent by M. Le Conteulx de Coumant, to this country, presumed to have been of the Spanish breed. In 1793, the Hon. Wm. Foster, of Boston, while a young man, traveling in Spain, smuggled, on account of their exportation being prohibited, two ewes and a ram on the ship Bald Eagle, to Boston; which he gave to his friend, Andrew Cragie, Esq., of Cambridge, who seems not to have been aware of their value, or to have found no market for the wool. Mr. Foster, after an absence of some years, is said to have met him at a sale where he was paying $1000 for a merino ram, and inquiring what became of those he gave him, Mr. Cragie replied, "I simply ate them."

bedding. On its completion he announced that he was prepared to card wool into rolls, at twelve and a half cents the pound; mixed, fifteen and a half cents; or if previously picked, mixed, and greased, ten cents and twelve and a half cents per pound. He soon after commenced the manufacture of carding machines.

The dressing of cloth had been recently commenced in Dalton, by Ezra Maynard.

About this time the first carding machines in Chelmsford (Lowell) were run by Moses Hale.

Miller and Whitney, proprietors of the saw gin, having submitted to the Legislature of South Carolina proposals to sell to the state, for the sum of $100,000, so much of the patent right as appertained to that state, where its use had become very extensive, and petitions having been presented from the planters, urging the transfer, the Assembly voted the sum of $50,000 for that purpose. Although the price was deemed a great sacrifice, the patentees accepted it as a certainty, and present relief from their embarrassment.

President Jefferson, in his first annual message to Congress, adverted to the success which had attended the continued efforts to introduce, among the Indians, the implements and practice of husbandry, and the household arts. A spirit of peace and friendship generally, prevailed among them, and some had begun to increase in population, instead of diminishing as heretofore. A letter from the Indian agent, Benjamin Hawkins, accompanying the message, states that one nation had just been supplied with 100 pairs of cards, and eighty spinning wheels; there were eight looms in the nation, four of them wrought by Indian women, and the remainder by white women. A young Englishman who could make looms and spinning wheels, and understood weaving, was appointed a temporary assistant. One of the looms and two spinning wheels, were made by an Indian for his own family.

The quantity of cotton grown this year, in all countries, was estimated at 520,000,000 pounds. Of the whole amount, 48,000,000 pounds, worth $8,000,000, were the product of the United States.

The capital employed in growing it was about $80,000,000, and the number of persons employed in growing and otherwise dependant upon it, was 100,000. The American states produced cotton in the following proportions, viz: South Carolina, 20,000,000 pounds; Georgia, 10,000,000; Virginia, 5,000,000; North Carolina, 4,000,000; and Tennessee, 1,000,000 pounds. The quantity exported from the United States, was 20,100,000, viz: South Carolina, 10,000,000, Virginia and North Carolina, 5,000,000, and Georgia, 3,000,000 pounds. The average price, during this year, of all kinds of American cotton, at the place of exportation, was forty-four cents, and the price in England was from seventeen to thirty-eight pence sterling.[1]

The quantity manufactured in the United States was 500 bales.

Buffalo, at the outlet of Lake Erie into Niagara river, at the mouth of Buffalo creek, was this year laid out by the Holland Land Company. In 1798 there were five dwellings, one tavern, and one store, all of logs, on the site.

A company of French merchants, under the name of Tarascon, Berthoud & Co., from Philadelphia, with twenty ship carpenters, joiners, and other mechanics, commenced this year the building of vessels and keel boats, to navigate the Ohio, being the first to engage in that business. This undertaking was originated by Louis Anastasius Tarascon, a wealthy and enterprising Frenchman, who, in 1794, established himself in Philadelphia as an importer of silks and French goods, and in 1799 sent two of his clerks, Charles Brugiere and James Berthoud, to examine the Ohio and Mississippi from Pittsburg to New Orleans, and ascertain the practicability of clearing ships, ready rigged, from Pittsburg to the West Indies and Europe. Their report being favorable, he immediately, with his brother and others, commenced a large establishment at Pittsburg, consisting of wholesale and retail store, warehouse, ship-yard, rigging and sail-loft, anchor shop, block manufactory, and every thing necessary to complete a vessel for sea. He built, during the summer of this year, the schooner Amity, of 120 tons, and the ship Pittsburg, of 250 tons. In the following spring they sent the schooner to St. Thomas, and the ship to Philadelphia, laden with flour, and thence to Bordeaux, and brought back a cargo of wine, brandy, and other French goods, part of which was sent to Philadelphia, at a cost of six to eight cents per pound for transportation. They built, the next year, the brig Nanino, of 200 tons, and in 1803, the ship Louisiana, of 350 tons, which they sent ballasted with "Stone Coal" and other articles, to Philadelphia, where the coal sold for thirty-seven and a half cents per bushel. In the ensuing year the ship Western Trader was built by the same firm.[2]

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(1) Secretary Woodbury's Report, 1835–36.

(2) Harris's Pittsburg Directory, for 1837. Simpson's Lives of eminent Philadelphians. Previous to this time travel and traffic upon the western rivers, was carried on almost exclusively in flat-boats, occupying several months of toilsome labor with sweeps, in the upward passage from New Orleans, and requiring the transhipment of goods at the Falls. Louis Philip, afterward king of the French, who spent some time at Pittsburg, in 1796, and other distinguished travelers, had no better conveyance. Pittsburg now has a continuous river communication with at least sixteen states and territories, nearly 400 counties, and five or six millions of population, over about 11,212 miles of navigation, with three avenues by water to the ocean. This, with its immense system of railway communication, renders it truly "the gateway of the west." Its vast river trade, now conducted like its land traffic, with the utmost speed and regularity by

Mr. John Irwin about the same time established a ropewalk in Allegheny, which he carried on extensively with his son, thirty-five years after.

The American Company of Booksellers, doing business in New York, Philadelphia, and Boston, was formed. It regulated the sale of books by Fairs, the first of which was held in the ensuing year, and prohibited auction sales by any of its members on pain of expulsion. A system of exchanges was also arranged between these cities, and large and expensive editions were published at the joint expense of the company, each dealer subscribing for a certain number of copies; these were called Trade Books, and were delivered in sheets, folded and collated, in which form these and other new books were at first chiefly offered at the Trade Sales.

The Philadelphia Premium Society was instituted for the purpose of fostering American industry by giving premiums for improvements in arts and manufactures.

The compound or oxyhydrogen blow pipe was this year invented by the late Prof. Robert Hare, of Philadelphia. By its aid many substances before deemed infusible were readily melted in a burning jet of the mixed gases. Profesor Silliman, a few years later, succeeded in melting lime and magnesia with it, and burned all the well-known metals, gun flint and corundum gems, producing, during the operation, light brighter than that of the sun. The hydrostatic blow pipe or bellows, invented by Dr. Hare soon after, was also capable of melting strontia and other refractory substances.[1]

Flax was this year first grown on the Genesee Flats, in Ontario Co., New York, where it has since been extensively cultivated.

The Connecticut Academy of Arts and Sciences, instituted at New Haven in 1799, was this year incorporated "for the purpose of encouraging literary and philosophical researches in general, and particularly for investigating the natural history of the state."[2]

The President sent a fleet into the Mediterranean to protect American shipping. The government purchased twelve acres of land at Philadelphia, for a Navy Yard, at a cost of $37,500.

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means of steam, was first commenced in 1756, by the ascent from the Mississippi of about thirty batteaux and 150 men, laden with supplies for Fort Duquesne. On the 23d Feb., 1777, fourteen carpenters and sawyers arrived from Philadelphia, and were set to work near a saw mill on the Monongahela, fourteen miles above Fort Pitt, where they built thirty batteaux, forty feet long by nine feet wide, and thirty-two inches deep, to serve as transports. This was the beginning of the boat building business there. The building of Kentucky flat and keel-boats, became a large business on the several tributaries of the Ohio.

(1) Silliman's Jour., vol. 1, p. 98. Reg. of Arts, vol. 1, p. 362.

(2) Miller's Retrospect of 18th Century, vol. 2, p. 259.

The manufacture of straw bonnets was this year commenced at Wrentham, Mass., which soon became a principal seat of that business.

The extensive establishment of Oliver Ames & Sons, for the manufacture of spades and shovels, was commenced at Easton, Mass.

Oliver Evans, of Philadelphia, this year completed, at his own expense, a small steam engine, with a six inch cylinder and eighteen inch stroke, at a cost of $3,700, which he applied to grind plaster of Paris, recently introduced as a fertilizer, from Nova Scotia, chiefly through the efforts of Judge Peters, of Philadelphia, who published a treatise on the subject in 1797. The success of the little engine, with which he was able to break 300 bushels, or twelve tons, of plaster in twenty-four hours, excited much attention. It was soon after employed to drive twelve saws, in sawing stone at the rate of 100 feet of marble in twelve hours. This engine was upon the high pressure system, since so extensively employed on railways, steamboats, and in factories, and which was this year patented by the Cornish engineer Trevethick, in England, whither Evans had sent drawings and specifications of his engine, several times during the last twelve or fifteen years, during the whole of which time the inventor had continually urged its importance for the propulsion of carriages, and of steamboats on the western rivers, by the aid of paddle wheels. It was commenced in the last year, his original purpose being to construct a locomotive steam carriage, as a debt of honor to the state of Maryland, which, in 1786, granted him exclusive privileges for the use of his improvements in flour mills and steam carriages, after his own state had rejected the latter as visionary. He had been unable to find any person to risk the expense, but was encouraged by Professor Robert Patterson, of the University of Pa., and Mr. Charles Taylor, a steam engineer from England, to whom he explained the principles of his engine, which they pronounced new to them. The Philosophical Society also, so far countenanced it as to reject that portion of a report on steam engines, by B. F. Latrobe, Esq., a scientific engineer of the city, in which he ridiculed the "Steam Mania" of Evans and others. The Society, however, retained a part of the report, in which Mr. Latrobe labored to show the impossibility of propelling boats economically by steam, on account of the engine, a scheme nearer realization in America than steam propulsion by land.[1] The locomotive was not completed until 1804.

(1) The first legislative act ever made authorizing a public railroad, was this year granted by Parliament, for the Surry iron tramroad in England, nine miles long, on which horse-power was employed, although private tramways of wood had been long in use. A locomotive, built by Trevethick & Vivian, was employed for the first time on the Merthyr Tydvit road, in South Wales, in 1804: and the first public railroad on which steam was applied, was the Stockton and Darlington, twenty-five miles long, opened Sept. 26, 1825, and worked by locomotive and stationary engines, and horses.

Among the patents issued this year, was one to Col. Alexander Anderson, of Philadelphia (Jan. 26), for brewing with Indian corn, and one to the same (Jan. 28), for a condenser for heating the wash in distilling. This process, by which the whole heat of steam is communicated to the wash without danger of burning it, effected a great saving in fuel and labor, and was one of the most important improvements as yet introduced in distilling. Messrs. Anderson and Hall, the former of whom had also patented a steam still in 1796, had the improvements in operation soon after in their stills at Lamberton, N. J., and they were also adopted by others. Two patents for improved evaporating processes in distilling, were also patented (Feb. 12 and March 2) by Benjamin Henfrey. Jesse Reed, of Mass., took a patent (June 9) for nails milled out of heated rods, and Wm. Leslie one for cutting and heading nails (Nov. 5).

Richard Robotham, of Hudson, N. Y., received letters patent (Oct. 10) for an air pump ventilator for ships, mines, etc., and one of the same date for a machine for ruling paper, etc. Making paper from curriers' shavings was the subject of a patent (Dec. 28) by Joseph Condit, Jr., of New Jersey.

A memorial presented to Congress, March 30, from citizens of Morris, Sussex, and Bergen counties, in New Jersey, concerned in the manufacture of bar, cast, and rolled iron, nail rods, and nails, asking an 1802 increase of duties on imported iron, was accompanied by the following statement of the number of furnaces, forges, etc., in the state. The number of forges then actually carried on was over 150, which at a moderate calculation, would produce twenty tons of bar iron each, annually amounting to 3000 tons. Seven blast furnaces in operation would yield on an average 500 tons each, amounting to 3500 tons annually. There were six blast furnaces not then in operation, and many unimproved sites equal to any in the state, besides many forges and sites for forges in the same condition. Of the forges above mentioned, about 120 were in the counties of Morris, Sussex, and Bergen, besides three blast furnaces all actually going. The state was capable of furnishing at least 5000 tons of bar iron annually, and 7000 tons of cast iron. There were four rolling and slitting mills, which rolled and slit on an average 200 tons, one half of which was manufactured into nails. The memorial was adopted at a public meeting and is signed by John Cobb, chairman.

By a resolution of the house these reports and memorials, with others from sundry calico printers, cordwainers, and shoemakers, were laid over to the next session.

The internal revenue duties on licences for the sale of wines and liquors, on refined sugar, sales at auction, and on carriages, which by an act of the last session had been continued without limitation, were repealed along with those on distilled liquors and stills, and on stamps, all of which ceased after 30th June.

April 29th.—A supplementary copyright act, required the notice of such right having been secured to be inserted in the title page or the following, instead of being published in the newspapers. It extended the privileges of copyright to embrace designs, etchings, or engravings of historical or other prints.

A proposition was made to light the neighborhood of Central Square, in Philadelphia, with gas. Benjamin Henfrey, an Englishman, who in 1797 endeavored to form a mining company, and during the last year had explored for coal near Baltimore, and also experimented with gas from wood in that city, and Richmond, which he actually succeeded in lighting with it, was proposed as a proper person to accomplish it. He proposed to light it with gas from coal, and was also an applicant to light the United States light-houses on the sea-coast in the same manner. He received letters patent from the United States government (April 16) for an "improvement, being a cheap mode of obtaining light from fuel."

In the spring of this year, the first application of gas which attracted any attention, was made by Mr. William Murdoch, the engineer of Messrs. Bolton and Watt, who, on the occasion of the national illumination at the peace of Amiens, lighted up the front of the Soho manufactory of his employers, with a public display of gas lights. The first application of coal gas for illumination, was made by Mr. Murdoch in 1792, when he lighted his own dwelling-house and offices at Redruth, in Cornwall, and in 1797, erected gas apparatus in Ayrshire, and the next year fitted up the gas work at Soho, near Birmingham. In 1804–5, the extensive cotton mills of the Messrs. Philips and Lee, at Manchester, were fitted up with 900 burners, giving a light equal to 2,500 candles, under the superintendence of Mr. Murdoch, who has been considered the parent of this mode of illumination. Its use from that time became general, and London was lighted with gas in 1807.[1]

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(1) The earliest distinct mention of an inflammable product from coal, is contained in a "Letter from Mr. John Clayton, Rector of Crofton, at Wakefield, in Yorkshire, to the Royal Society, May 12, 1688, giving an account of several observations in Virginia, and in his voyage thither, more particularly concerning the Air." The author, whose remarks on the natural history of Virginia we have before cited, in speaking of the meteorology of the country, compares the sulphurous smell, sometimes observed during heavy thunder storms, to "some sulphureous spirits I have drawn from coals, that I could no way condense, yet were inflammable, nay, would burn after they passed through water, and seemingly fiercer if they were not overpowered therewith. I have kept of this spirit a considerable time in bladders, and though it appeared as if it was only blown with air, yet if I let it forth and fired it with a match

The first considerable importation of Spanish merino sheep yet made into the United States, arrived in May, in the ship Perseverance of 250 tons, Capt. Caleb Coggeshall master, about fifty days from Lisbon, where they were shipped on the 10th April, by the Hon. David Humphreys, United States Ambassador at the court of Madrid. They were landed at Derby, Conn., having been transferred to a sloop in the harbor of New York. They consisted of twenty-one rams and seventy ewes, from one to two years old, out of a flock of 100, four rams and five ewes having died on the passage. They had been purchased for Col. Humphreys in Spain, by a reputable person, and driven across the country of Portugal by three Spanish shepherds, escorted by a guard of Portuguese soldiers. The Trustees of the Massachusetts Society for Promoting Agriculture, at a meeting held on 28th August, when a letter on the subject from Mr. Humphreys to Aaron Dexter was read, voted the thanks of the meeting for the communication, and on 29th Oct., voted to present him with the gold medal of the Society, "for his patriotic exertions in importing into New England 100 of the merino breed of sheep, from Spain, to improve the breed of that useful animal in his own country."

On the 14th April, Mr. Humphreys dedicated to the Prince Regent of Portugal a poem "on the Industry of the United States of America," written at Lisbon, and designed "to show the prodigious influence of national industry in producing public and private riches and enjoyment."[1]

About the same time that Mr. Humphreys' flock arrived from Spain, the Hon. Robert R. Livingston, the American minister resident at Paris, sent, for his farm at Clermont, in New York, some half-a-dozen or more selected from the national stock at Rambouillet, near Paris.

The introduction of these two lots of pure merinos, and the exertions of their respective owners, within a few years, much improved the breeds of the country, and several manufactories of fine woolens, with appropriate machinery, were established, which afforded a market for the wool, and induced others to import fine wooled sheep, while it stimulated improvements in sheep husbandry generally. The price of Spanish merino bucks, at this time, was about $300.

In June, a literary Fair or Trade Sale of books was held in New York for the first time in the United States, which was attended by a large number of booksellers. It was held under the auspices of the American

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or candle, it would continue to burn until all were spent." In a letter written about the same time, to the Hon. Robert Boyle, published in the Philosophical Transactions for 1739, he details more fully his experiments, in the distillation of the "*Spirit of Coals*," and appears to have made a near approach to a practical discovery.

(1) Miscel. Works of D. Humphreys, 4th ed., N. Y., 1804, pp. 225, 346.

Company of Booksellers, among whom was Mr. Carey of Philadelphia, a leading publisher, and who was one of the first to suggest it, and most energetic in its support. It was proposed to hold them statedly, and alternately at New York and Philadelphia. The publishing business was, through their agency, rapidly increased in all the principal cities.[1]

On July 31, two weekly journals were published in Ohio; the "Western Spy," at Cincinnati, and the "Sciota Gazette," at Chilicothe, the first inland town in the north-western territory which had a press. They were printed on paper of inferior quality, brought from Georgetown, Kentucky, on horseback, and their united circulation did not exceed 600 copies. The latest news in the Spy of this date, from France, was dated May 17; from London, May 10; from New York, July 9; and from Washington, July 25.[2]

The white population of Ohio was 76,000. A state constitution was framed at Chilicothe, by virtue of which Congress authorized its admission as a state of the Union.

The first press and newspaper in Mississippi, "The Natchez Gazette," was this year established by Col. Andrew Marschalk, who continued it under different names for about forty years. Natchez was a large village, consisting chiefly of small wooden buildings scattered irregularly over considerable space. The currency of the territory consisted at this time in part of "Cotton Receipts," negotiable by law as bills of exchange or money. They represented so much cotton deposited in public gins, for cleaning, the farmers being in general too poor to have private gins.[3] The first exports from the territory, of which there is any account, were made the last year to the value of $1,095,412, and this year $526,016.

The first official return of the exports from Kentucky and Tennessee, was this year made, and amounted in the former to $626,673, and in the latter to $443,955. The first exports of Indiana were made the year before, to the amount of $29,430.

The Legislature of North Carolina agreed to purchase, of Miller and Whitney, the patent right of the saw gin for that state, and laid a yearly tax of two shillings and six pence upon every saw (amounting in some gins to forty), employed in ginning cotton, during the next five years, which contract was faithfully performed. About the same time negotiations were entered into between the patentees and the state of Tennessee, which in the following year laid a tax of thirty-seven and a half cents per annum, on each saw used in that state within the next four years.

The second annual message of President Jefferson, recommended to

(1) Miller's Retrospect, vol. 2, p. 387.

(2) Histor. Mag., vol. 3, p. 127.

(3) Monatte's Valley of the Mississippi, vol. 2.

Congress, among the landmarks and rules of action by which they were to be guided for the public good, "to cultivate peace, and maintain commerce and navigation in all their lawful enterprises; to foster our fisheries as nurseries of navigation and for the nurture of man, and *protect the manufactures* adapted to our circumstances, etc.," as also "to cherish the Federal Union as the rock of safety."

A Mechanics' Association, of about 100 members, was formed at Portsmouth, New Hampshire, for the purpose of encouraging and promoting industry, good habits, and an increase of knowledge in the mechanic arts, and for the mutual benefit of its members. It is still in existence.

The Danvers & Beverly Iron Company was incorporated with a capital of $330,000.

The only manufactory of sheet copper in the country was that of the Messrs. Revere, at Boston, Massachusetts.

Additional glass works were built in Pittsburg by General O'Hara, who made preparations to manufacture white and flint glass, and sent an agent to England to obtain workmen, in which he was unsuccessful.

The Legislature of Pennsylvania having, on the 7th March, 1800, revised the act incorporating a company for promoting the cultivation of the vine, under new commissioners, and in the January following, by a supplementary act removed the chief obstacle to obtaining subscriptions, the organization of the company was this year completed, with Dr. Benj. Say as president, Isaac W. Morris, treasurer, and Jared Ingersoll, John Vaughan, Dr. Jas. Mease, Fred. Heiss, and Elisha Fisher, as managers.

The company had 30,000 vines growing at Spring Mill, under the care of Mr. Legaux, whose disagreement with the company soon after, led to the establishment of separate vineyards at that place.

In addition to the vine company's, there were several private vineyards in the city and county at this time, viz: Montmollin's, Ridge Road four miles from the city, consisting of 4,000 plants; Peter Kuhn's, one mile from the last, consisting of Lisbon, Malaga, and Madeira grapes; Dr. James Mease's "in the line of Cherry street," with 3,000 plants; Paul Labrouse's, about one mile from the city, between Second and Third streets, Southwark; Crownsillat's, four miles from Philadelphia, on the banks of the Schuylkill, 1,500 plants; Thunn's, south of the last named, and Stephen Girard's, near the same place, with forty or fifty plants only. The grape was at this time cultivated successfully by Mr. Autill in New Jersey, and by Mr. Notnagel near Bristol, and others in these and neighboring states.

The Catawba grape was this year first discovered by Mr. Murray, an emigrant from Pennsylvania, on the Block Ridge mountain, in Buncombe county, North Carolina, about ten miles S. E. of Ashville.

They were named the Catawba by Senator Davy, who transplanted some of them to his residence at Rocky Mount, on the Catawba river. whence he introduced them, a few years after, under that name, among his friends in Washington and Maryland. Major Adams, of Georgetown, first discovered its value as a wine grape about 1822, and two or three years after, sent slips of it to Nicholas Longworth of Cincinnati, who established its reputation, as well as the wine manufacture in the west.

It was estimated that $130,000 was invested in the manufacture of salt, in Barnstable Co., Mass., which yielded a net profit of twenty-five per cent. on the investment. The process had been much improved within a few years, and several patents had been obtained by individuals on the cape. The salt was very pure and white, and the glaubers salt produced in the process was of the best quality. The number of works in the county was 136. The number of feet of surface was 121,313, and the capacity equal to the manufacture of 40,438 bushels of common salt, and 181,969 lbs. of glaubers salt, worth together $40,700. The works were to be increased the next year, by the addition of 27,578 feet. Capt. John Sears was the only successful manufacturer, by solar evaporation alone, for which he had extensive works in Dennis, having triumphed over numerous difficulties. Salt was also made at Martha's Vineyard, Nantucket, Plymouth, Kingston, Rochester, Hingham, and Dorchester; in nearly all of which it had been commenced within two or three years. The works in Dorchester were erected this year, at Preston's Point, by Capt. Deane, and consisted of a series of vats 200 feet in length, by twenty feet wide, or 4,000 superficial feet of evaporating surface; and were soon after followed by others on an improved plan. Two patents were taken out in this branch, one by Benjamin Ellicott, of Maryland (May 12), for a machine for manufacturing salt; and the other by Valentine Peers (Dec. 18).

The manufacture of clocks by water power, for a wholesale trade, was this year commenced at Plymouth, Conn., by Eli Terry; an enterprise regarded by many, as a rash adventure. Simon Willard, of Mass., patented (Feb. 8), his celebrated time-piece.

Among the patents (sixty-five in number), issued this year, the following, in addition to those mentioned, were the most important. Manufacturing starch from potatoes, by John Biddis (March 22). Improvement in a saw mill, which returns the log after each cut, by Moses Coates (April 1). This contrivance, which was not appreciated at the time, performed automatically, by very simple mechanism, several operations which successive improvements were only able to attain thirty years after.[1] Edward West patented (July 6) a machine for cutting, and another for heading and cutting nails; an improvement in the gun lock, and another in the steamboat. It has been claimed for him, that he made the first working model of a steamboat in this country, which he is said to have run upon a river in Kentucky. Several other patents were granted for nail-making. An improved boiling cistern, by Timothy Kirk, of Yorktown, Pa. (Dec. 28), was considered a novel and useful invention.[2] Burgiss Allison and John Hawkins, received letters patent (Dec. 30), for manufacturing paper from corn husks.

1803 A memorial to Congress, from the gun manufacturers of the borough of Lancaster, Pa., against the remission of duties upon arms manufactured in foreign countries, states that manufactories of arms had been established there, and in other parts of the state, at much expense, and 20,000 stand were nearly completed for the Commonwealth of Pennsylvania. Mills for boring gun barrels had been erected, and the locks, and every other part, were made in the best manner. They were confident 20,000 stand of arms could be annually made in the state, and in five years, with continued protection, the business would be fully established.

The committee of commerce and manufactures, reported, on the subject of petitions from the Franklin Association and other journeymen printers, calico printers, cordwainers, paper makers, letter founders, makers of umbrellas, brushes, glass, stoneware, gunpowder, hats, and starch, in favor of protecting duties. The committee considered it justice to the petitioners, and sound policy, to extend protection to such manufacturers, as were obviously capable of affording to the United States an adequate supply of their respective products, either by a free admission of raw material, or by higher duties on manufactures. The existing rates, being nearly equal on most articles, they considered rather a burthen to the workingman, than a protection to the manufacturer. They recommended the Secretary of the Treasury to prepare, against the next session, a plan for new and more specific duties, which should leave the amount of revenue the same at it then was.

A very complete and curious set of merchant flouring mills, capable of manufacturing from five to six hundred bushels of wheat into flour daily, went into operation at the village of Madison, four miles from the mouth of Catskill Creek, in Greene Co., New York. They were built by Ira Day & Co., and contained two water-wheels and four pairs of stones with elevators, fanning mills, smut machines, cooling apparatus,

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(1) Pat. Off. Rep. 1843, p. 299. (2) Dom. Encyclop. vol. 5, p. 357

weighing hoppers, packing screws, and other machinery, moved by the water wheels; each of which was turned with about one half the quantity of water required for a common grist mill. Catskill contained seven grist mills, and about as many saw mills.

In April, the New York Legislature passed an act, extending to Messrs. Livingston and Fulton, for the term of twenty years from this date, the rights and exclusive privileges granted to Mr. Livingston in 1798, of navigating all the waters of that state, by vessels propelled by fire or steam. It also extended for two years,—and by a later law, to 1807,—the time in which to make proof of the practicability of propelling a boat of twenty tons, at the rate of four miles an hour, against the current of the Hudson.

Messrs. Livingston and Fulton, after several trials with models, in the last year, at Plombieres, in France, having adopted paddle wheels, completed, about this time, an experimental boat which, meeting with an accident, was nearly altogether rebuilt, sixty-six feet long by eight feet wide, and finished in July. The first trial of a steamboat on the Seine, was made by them early in August, in presence of the French National Institute, and a great concourse of Parisians. Encouraged by their success, and to attain greater speed by improved machinery, an engine was immediately ordered from Messrs. Watt & Bolton, of Birmingham, to be sent to the United States, whither Fulton proceeded to construct and operate, under the foregoing act, his first steamboat in America. Miller and Symington, in March, 1802, navigated the Forth and Clyde canal, with the side-wheel steamer Charlotte Dundas, in which Fulton was a passenger.

During this year, John Stevens, of Hoboken, is said to have made an experiment on the Passaic river, with a boat propelled by forcing water through an aperture in the stern, by means of a pump.[1]

In consequence of letters written in the last year, to a gentleman in Kentucky, by Oliver Evans, stating that he had his steam engine in operation, Capt. James McKeever, of the U. S. Navy, and M. Louis Valcour, united to build a steamboat of eighty feet keel and eighteen feet beam, to ply between New Orleans and Natchez. The boat was built this year in Kentucky, and floated to New Orleans, to be supplied with an engine, by Evans. The subsidence of the river, which was not expected to rise again for six months, having left the boat on dry land, and the capital of the owners having been exhausted, they allowed Mr. William Donaldson to put up the engine in a saw mill, and were astonished to learn that it was sawing 3,000 feet of boards every twelve

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(1) Renwick on the Steam Engine.

hours, when boards were selling at $60 per thousand. They were now confident of succeeding with the steamboat, but were disappointed and ruined by the burning of the mill, after two previous incendiary attempts of hand sawyers, whereby they lost $15,000. The engine consumed one and a half cords of wood daily, and ran over twelve months without getting once out of order, and in 1810 was set to pressing cotton.

Cotton machinery was manufactured in Philadelphia at this time, by Mr. Eltonhead.

Calico printing was carried on by the following persons in Philadelphia and vicinity, viz.: John Hewson, at the Globe Mills, in the city, Mr. Stewart, at Germantown, and Mr. Thorburn, at Darby. The three were expected to turn out, during the year, 300,000 yards of goods.[1]

Manufactures were this year first regularly distinguished, as to quantity and value, from other articles, in the returns of exports. The total value of exports was $55,800,033. The value of domestic articles exported, was $42,205,961, in the following proportions, viz.: products of the sea $2,635,000, of the forest $4,850,000, of agriculture $32,995,000, and of manufactures $1,355,000. Of agricultural products, vegetable food constituted a value of $14,080,000. Cotton of domestic and foreign growth was exported to the value of $7,920,000. The exports of Michigan were for the first time embraced in the returns, and amounted to $210,392.

In December, the ship Eliza, Captain Bissel, sixty days from Cadiz, arrived, with two merino rams and two ewes, for Dr. James Mease, of Philadelphia, who had ordered one pair, two years before. To his great disappointment, they all proved to be black, though fine wooled, a circumstance which he could only attribute to a desire to increase the profits, black sheep being little valued in Spain, and their wool chiefly used for the clothing of shepherds and the poor peasantry. Their price to him was sixty dollars and the freight twenty dollars.

The total tonnage of new vessels built in the United States during the year, was 88,448 tons.

The "Miami Exporting Company," of Cincinnati, was incorporated for forty years, with a capital of $450,000 for banking purposes, being the first in that city. Its dividends, for a number of years, were ten to fifteen per cent.

The brig Ann Jane, of 450 tons, was built at Elizabeth on the Monongahela, sixteen miles above Pittsburg, for the Messrs. McFarlane,

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(1) Communicated by Thompson Westcott, Esq.

merchants. She was one of the fastest sailers of her day, and ran for some time as a packet to New Orleans.

The brig Marietta of 130 tons, another of 150 tons, and the schooner Indiana of 100 tons, were built in Ohio in the spring of this year.

The "flax rust," the most destructive disease to which the flax crop in New York is subject, first made its appearance at Bridgehampton, near the east end of Long Island. This parasite appeared in Berkshire county, Massachusetts, three years after.

The manufacture of dressed deer skins for gloves, money belts, under clothing, etc., was this year commenced as an independent business at the village of Gloversville, New York, by Ezekiel Case, who had learned the art at Cincinnati. From him and Talmadge Edwards, the business was learned by W. T. Mills and James Burr, who became noted manufacturers, and improvers of the art. The business extended thence to Johnstown, the county seat.

The manufacture of cotton and wool cards was established in New York, under the management of Samuel Whittemore, a younger brother and partner of Amos and William Whittemore, of Cambridge, Mass.

A large plaster mill, seventy-five feet by forty-five, now a part of the Auverge or "New Mills," at Newburg, New York, was erected this year, by a Mr. Belknap. The use of plaster of Paris, as a fertilizer, was much promoted by the exertions of Chancellor Livingston.

The Legislature of South Carolina annulled the contract made last year with Miller and Whitney, proprietors of the saw gin; suspended payment of the balance due them ($30,000), and instituted a suit, to recover what had been already paid them, alleging as the reasons, a want of validity in the patent, and the non-performance of certain conditions of the contract by the patentees. In Georgia, the most persistent efforts were made to invalidate the patent. Prior claims to the invention were preferred on behalf of Hogden Holmes and Edward Lyon, of that state, and of a Swiss machine of earlier date. The Governor, in his annual message, advised that compensation be withheld, and a committee reported in favor of instructing their representatives to procure a modification of the patent act, so as to get rid of the monopoly, and if that failed, to endeavor to induce Congress to purchase the patent right, and release the Southern States from so burthensome a grievance. The states of South and North Carolina and Tennessee were invited to co-operate with Georgia. Popular feeling, stimulated by the most sordid motives, was so far awakened in the cotton states, that Tennessee suspended the payment of a tax laid earlier in the year, upon cotton gins, for the benefit of the patentees. A similar attempt, afterward made in the Legislature of North Carolina, wholly failed, and both branches declared by resolution, that "the contract ought to be fulfilled with punctuality and good faith." Honorable men in other states, were indignant at the measures of the Legislatures, and South Carolina, the next year, rescinded the resolution of the previous house, and testified its respect for Mr. Whitney by marked commendation, expressions grateful to those whose sense of justice was not obscured by interest or prejudice.

Mr. Whitney's partner died on 7th December of this year, weighed down with repeated disappointments in his business transactions.[1]

The first cotton manufactory in New Hampshire was built at New Ipswich.

The second cotton factory in Massachusetts, and the third in the vicinity of Providence, was erected this year, and was followed by a fourth the next year. The whole number of mills in operation in the United States, at this time, was but four. They were rapidly multiplied in Rhode Island from this time.

The price of cotton yarn at Providence, was, for number 12, 94 cents, for number 16, 110 cents, for number 50, 126 cents per lb.

At Queretaro, near the city of Mexico, at this time, were cotton factories as large as any in France, as well as large woolen manufactories, which, during the year, worked up about two million dollars' worth of woolen cloths, bay, druggets, serges, and cotton stuffs. The establishment consisted of factories and workshops, in the latter of which, more than 300 in number, the operators worked at the cost of their employers.

Levi Thurston commenced the manufacture of scythes in Orange, Connecticut, with the first trip hammer in the town.

The manufacture of blacking was, about this time, commenced by Lee & Thompson, who long supplied the public with "Lee's Improved Steam Blacking," at No. 1 John St., New York, and acted as agents of the celebrated Day and Martin's liquid blacking, first introduced, only two years before, in England.

The practice of treading out wheat, barley, and other grain, by oxen and horses, upon open, circular threshing floors, of hard rolled earth, was extensively practiced, at this time, in Rhode Island and portions of the Middle States, as the most expeditious and economical method, notwithstanding the introduction of several patent horse power threshing machines.

Among the patents issued this year, were several for improvements, by citizens of different states, in machines for ginning cotton; an apple paring machine, the first of its kind, by Moses Coats, an ingenious mechanic of Downingtown, Pa. (Feb. 14); a machine for cleaning clover

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(1) Olmstead's Memoirs.

seed, long exhibited in the model room of Peale's Museum, (March 21); an improvement for cutting grain and grass, by Richard French and John T. Hawkins of N. J. (May 17), which was the first mowing or reaping machine recorded. Several other patents were taken out for agricultural machinery, a number connected with distilling, for ruling paper, making wrought and cut nails, and for extracting the coloring matter of vegetables, and preparing dyers', painters', and printers' colors, etc.

Feb. 7.—The Board of Managers of the Pennsylvania Society for the Encouragement of Manufactures and the Useful Arts, organized in August, 1787, addressed a circular communication, with a plan of 1804 their constitution, to all societies for the promotion of useful knowledge, and to the people of the United States generally, for the purpose of exciting a renewed interest and activity in the advancement of the *manufacturing interest* of the country, an object which the Society was established to promote, and in which it had recently experienced increased energy. The "Manufacturing Committee" of the Society, a body distinct from the Board, had, for several years, suspended the business of their department, in consequence of the destruction, by fire, of a large part of its stock in furniture, raw materials, manufactured goods, and some valuable cotton machinery, but were now resuming operations.[1] The community was cautioned in a particular manner against similar dangers in labor-saving manufactories. The Society invited communications from associations engaged in promoting either science or manufactures. In view of the great influence which the progress in chemistry, natural history, mechanics, and the doctrine of fluids, had exerted within fifty years, in elevating the character and increasing the profits of the manufacturing classes, they suggested to all scientific institutions the formation of a standing committee of arts and manufactures, and to societies, kindred to their own, a particular examination of all matters relating to manufactures within their sphere, and the publication of the results, with a detail of the facts. The circular, which was impressed with the ardent mind of the president of the Board, Mr. Tench Cox, was accompanied by a "Report on the state of manufactures in the United States generally, and particularly in the State of Pennsylvania, at the time of the establishment of this Society, and of their progressive increase and improvement, to the present time."

The first machine for cleaning docks by steam, ever constructed, was about this time completed by Oliver Evans, at the Mars Works, Philadelphia, by order of the Board of Health. It was called the *Erukter*

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(1) See vol. 1, p. 409.

Amphibolis, and consisted of a large flat or scow, with an engine of five horse power for working machinery. Having been fitted with temporary wheels on wooden axles, the machine, of a weight equal to 200 barrels of flour, was driven through the street to the river Schuylkill, where it was launched, and with paddle-wheels at the stern, was propelled a distance of sixteen miles into the Delaware. Later in the year, Evans submitted to the Lancaster Turnpike Company an estimate of the profits of a steam carriage, to carry 100 barrels of flour fifty miles in twenty-four hours, and offered to build such a locomotive carriage. He published, the next year, "The Young Engineer's Guide," descriptive of the principles and manner of working the steam engine for propelling boats or land carriages.

The Province of Louisiana, having, by the treaty of April 3, 1803, been transferred by France to the United States, for the sum of $15,000,000, Upper Louisiana was, in conformity with the act of 20th October of the same year, surrendered (March 10) to the agent of the United States, Capt. Amos Stoddard. That portion of the colony south of the thirty-third parallel, now the State of Louisiana, previously taken possession of, was called the Territory of Orleans, and all lying north of it, and west of the Mississippi, the District of Louisiana, attached to the Territory of Indiana. The village of St. Louis contained but two American families, and its population was less than 1,000 souls. The fur trade constituted its chief business interest, and amounted, during the next fifteen years, to $203,750 annually. *Peltry-bonds*, or bills, payable in peltries, was its principal currency. The first returns of exports, from the Territory of Orleans, this year, amounted to $1,600,362.

Many of the petitions, presented in the last session of Congress, from manufacturers and tradesmen, were renewed, and others from the manufacturers of plated trappings for carriages and horses, the stainers of cotton goods, cork-cutters, and artizans of nearly all kinds, asked protection and encouragement of their several branches, and were the subject of a report by the Committee of commerce and manufactures.

Congress, by a unanimous vote, increased the duties upon imports by about two and a half per cent., the proceeds to constitute a "Mediterranean Fund," for defraying the increased expense of naval operations to suppress the piracies of the Barbary powers.

A duty of fifty cents per ton, as light money, was imposed on all foreign vessels, entering the United States ports. Additional specific duties were laid on certain articles. It was also enacted that a registered vessel lost its American character, if its owner, being a naturalized citizen, resided for more than one year in his native country, or more than two years in a foreign country, except as a consul or public agent.

The charter of the Society of Agriculture, Arts, and Manufactures, in New York, granted in 1791, having expired, it was re-incorporated, as the "Society for the Promotion of the Useful Arts." It published, previous to 1815, nine volumes of Transactions.

The Middlesex County Agricultural Society, in Massachusetts, formed in 1794, and probably the first county association of the kind in the United States, was also incorporated this year.

In May, John Cox Stevens, and his son, Robt. L. Stevens, crossed from Hoboken, N. J., to New York, in a boat propelled by *steam.*

The village of Harmony, in Butler Co., Pa., was settled by about twenty families of "The Harmony Society," from Wirtemberg, in Swabia, under Mr. George Rapp, who preceded them about a year, and purchased 4,700 acres of land. During the next six years the Society was increased to 140 families, and cleared 1,600 acres of land, erected frame and brick dwellings, barns, and warehouses, laid out a vineyard, built grist, sawing, corn, oil, and hemp mills, a tannery, brewery, distillery, dye-house, potash, soap boilers and candle works, etc. They also erected a large factory, and commenced successfully the manufacture of broadcloth, from the wool of merino sheep raised by them. Their vines and merino sheep, which were special objects of attention, not succeeding so well as they wished, the Society sought a more favorable climate in Indiana, and renewed their enterprises at New Harmony, on the Wabash, whence they returned in about ten years, and settled at Economy, in Beaver Co., Pa.

The tonnage of new vessels registered and enrolled this year, was 103,753 tons. The total tonnage of the Union, of every description, was 1,042,404. The average tonnage of vessels annually built and registered in the British Empire, in the last twelve years, was 100,487 tons.

The first iron foundry in Pittsburg was established by Joseph McClurg.

Cotton was carded and spun in Pittsburg, by the carding machine and spinning jenny, to the amount of $1,000, being the first manufacture of the kind in the place.[1]

The first ark load of bituminous coal was sent down the Susquehanna, 260 miles, to tide water at Columbia, by Mr. W. Boyd. It was from the vicinity of Oldtown, now Clearfield, and was a curiosity to the inhabitants of Lancaster Co.[2] The existence of brown coal, or lignite, in Missouri, was this year noticed by Lewis and Clarke, who traced it from about twenty miles above the Mandan villages, on the Missouri,

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(1) Cramer's Almanac for 1804.

(2) Taylor's Statistics of Coal, Am. ed. p. 330.

2,454 miles up the river, and nearly to the base of the Rocky Mountains, as well as upon the Yellowstone, and other tributaries of that river.[1]

The improvement of the texture of the cotton fibre was, about this time, made the subject of successful experiments, by Kinsey Burden, Sen., of St. John's, Colleton, in South Carolina, who, in this or the following year, produced from carefully selected seed, specimens of cotton worth, in the English market, twenty-five cents per pound more than any other. The secret of his success was long unknown. The crops in that state were this year destroyed by the hurricane. The cotton fields of Iberville, in Louisiana, were about this time first devastated by the Chenille or cotton insect.[2]

The first regular cotton factory in the State of New York, was erected in Union Village, Washington Co., by William Mowry, who had acquired a knowledge of the business in the pioneer establishment of Samuel Slater, at Pawtucket. It continued in almost constant operation until 1849, when it was still the largest in the country—a large and flourishing village having grown up around it.

The cotton manufacture was about this time commenced also in Connecticut.

The first broadcloth from merino wool, was made at Pittsfield, Mass., by Arthur Scholfield. It was gray-mixed cloth, and all the merchants in town declined purchasing it when finished, although Josiah Bissel, a principal dealer, is said to have made a journey to New York a few weeks after, and brought home two pieces of the same goods, bought as foreign cloth. Mr. Scholfield at this time also carried on the manufacture of single and double carding machines of improved pattern, and the carding of wool, at eight cents per pound for white, and twelve and a half cents for mixed wool. Carding machines and various manufacturing operations, were from this period rapidly introduced into Pittsfield, Lenox, Lanesborough, Dalton, and neighboring towns. Cards made by the Shakers were in use at this time.

The manufacture of gunpowder was carried on upon the Brandywine, in Delaware, by Mr. E. Irene Dupont de Nemours, whose powder, in packages impressed with the figure of an eagle, was already celebrated for its excellence.[3] The proprietor patented a machine for granulating gunpowder, early in this year.

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(1) Taylor's Stat. of Coal, Am. ed. pp. 490, 491.

(2) Cotton Plant. De Bow's Industrial Resources, vol. 1, pp. 172, 173.

(3) Wilson, the American Ornithologist, in his poem, "The Foresters," speaks of the woodman in the wilds of Pennsylvania, admiring his powder during his pedestrian tour in 1804. He says it left no stain on paper when burned:

The first quarto Bible, from movable types, ever set up in the United States, was printed in Philadelphia, by Mathew Carey, at a first cost of $15,000. The type was furnished by James Ronaldson, in South street above Ninth, the only type founder, at that time, in the country. The type was kept standing until 200,000 impressions were printed.[1]

The American Company of Booksellers offered a gold medal of the value of fifty dollars, for the greatest quantity, and best quality of printing paper, not less than fifty reams, made from other materials than linen, cotton, or woolen rags; and a silver medal worth twenty dollars, for the greatest quantity, not less than forty reams, of wrapping paper, from new materials. The Messrs. H. and S. Fourdrinier, wealthy stationers and paper manufacturers of London, this year purchased, of Didot & Gamble, the patents in Robert's machine, and commenced at Boxmoor a series of costly experiments and improvements in the machine which bears their name. Its success was greatly promoted by the skill of Mr. Donkin, the eminent manufacturer of paper machinery, who this year erected, at Two Waters, his second machine, which proved the practicability of making paper in continuous sheets.[2]

The American Philosophical Society about this time, offered an extra Magellanic premium—a gold medal, worth from twenty to forty dollars, or its equivalent in money—for an essay upon the subject of American permanent dyes, or pigments, illustrated by experiments, and accompanied by specimens of the materials and of the articles colored.[3]

Surgeons' instruments were made in Philadelphia, by R. B. Bishop. The Axle Tourniquet, patented in 1801, by Dr. Joseph Strong, of Pa., was described, in the London Medical and Physical Journal for Oct., as the invention of a Mr. Blake, in England.[4]

A patent was issued (Jan. 25) to Thomas Benger, for an improvement in preparing quercitron or black oak bark, for exportation or home consumption, for dyeing and other uses. O. Evans patented (Feb. 14) a screw mill for breaking and grinding hard substances, and also an improvement upon the steam engine, "by the application of a new principle, by means of strong boilers to retain and confine the steam; thereby increasing the heat in the water, which increases the elastic power of the steam to a greater degree." A spinning and twisting mill, for making cordage, was patented (Feb. 27) by Wm. B. Dyer; and a

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"From foaming Brandywine's rough shores
it came,
To sportsmen dear its merits and its name;
Dupont's best Eagle, matchless for its power,
Strong, swift and fatal as the bird it bore."

(1) Philadelphia and its Manufactures, by Edwin T. Freedley.

(2) Munsell's Chronology of Paper.

(3) Philad. Med. Museum, vol. 1, p. 449.

(4) See Coxe's Phila. Med. Museum, vol. 1, pp. 186, 311.

machine "for preparing what is commonly called top or swingled tow, for paper" (March 19), by Abraham Frost; and an improvement in manufacturing coat and waistcoat buttons, by Geo. W. Robinson (March 24) The patentee became, at Attleboro, Mass., the most extensive manufacturer of metal buttons in the United States. A straw and hay cutter, patented (April 30) by Moses Coates, of Downingtown, Pa., was considered more simple and cheap than any in use, and was generally adopted in the neighboring counties. An improved lantern, a composition for drawing or writing tablets, and a machine to cut strips or chips of wood, for hats, bonnets, etc., were the subjects of patents, by Amos D. Allen (May 10). Burgiss Allison and Richard French, patented (June 8) a machine for making nails and spikes, which was successfully put in operation this year or earlier; Asa Spencer, an improvement in making thimbles (June 8). Another machine for cutting chips or strips of wood to make chip hats and bonnets, brooms, baskets, sieves, matting, and for various other uses, by John Roberts, Amos D. Allen, and Ezekiel Kelsey (Sep. 5), was in aid of a business, which was soon after prosecuted in several parts of the country. E. I. Dupont de Nemours, patented (Nov. 23) a machine for granulating gunpowder, which was brought into use in his extensive powder mills, on the Brandywine. A machine for boring gun barrels, by Nathan Fobes (Dec. 31). The whole number of patents issued was eighty-three, a greater number than in any previous year.

The Middlesex canal, connecting Boston harbor with Concord river, a branch of the Merrimac, above Lowell, through Medford, Woburn, and Wilmington, was completed by a company, incorporated in 1789. It was the first great work of the kind finished in the United States The distance was about twenty-seven miles, and the cost upwards of $550,000. The summit level was 107 feet above tide-water, and thirty-two above the Merrimac, at Lowell, and the whole descent was effected by twenty-two locks, ninety feet long by twelve feet wide, of solid masonry. The water power and communication thus obtained, prepared the way for the manufacturing operations of the neighborhood.

The manufacture of printing presses, copperplate, and book binder's presses, and printing-house furniture of all kinds, was carried on at this time, in Carter's alley, Philadelphia, by Adam Ramage.

The first *busts* ever executed in American marble, were carved for James Traquair, stone cutter, Tenth and Market sts., Philada., by Jos. Jurdella, an Italian, who had been employed, ten or twelve years before, by the celebrated Italian sculptor, Cerracchi, in making, in this country, under his direction, busts of Washington, Jefferson, Hamilton, and Rittenhouse. Busts of Washington, in Carrara marble, from a cast by Uden, also of Hamilton—from whose bust by Cerracchi casts in plaster were this year struck in New York, by John Dixey—were made at $100 each, and half size likenesses of Penn, Washington, and Franklin, both in Italian and Pennsylvania marble. Busts of Penn and Washington were presented to the Pennsylvania Hospital, which was about this time also presented with a leaden statue of the founder, by his grandson, the Hon. John Penn, of Stoke, England.

In March, a company was incorporated in Pennsylvania, for obtaining slate, from quarries in the county of Northampton, suitable for roofing, and other purposes.

1805 The cloth manufacturers and dressers, in Pittsfield, Mass., had become so numerous, that, in April, a public proposal was made for their combination into a society, for the purpose of investigating the natural qualities of chemical liquids, and improving the making and dressing of cloth. Arthur Scholfield made and sold double carding machines for $400, or $253 without the cards, and picking machines, for thirty dollars each. The first machines made by him, about four years before, are said to have sold for $1,300 each.[1]

Mr. John Lee, who had become the proprietor of the woolen mill in Byfield, succeeded, about this time, in shipping clandestinely, from England, in large casks labelled as "hardware," in charge of his brother-in-law, James Mallalow, a quantity of cotton machinery, consisting of drawing, and spinning frames, or mule throstles, which, to avoid suspicion, he followed in another vessel. The machinery was erected in the factory building, where it was at first employed in spinning wick yarn, and warp, which were in much demand for household manufactures. Bed ticking, coarse gingham, and sheeting, and other heavy articles, all woven by hand, were soon after added. The last article then sold at fifty cents a yard, and gingham for about seventy cents.

This factory is said to have been one of the first to produce that class of goods.

The Kings County Society of Mechanics and Tradesmen, in New York, was incorporated.

In the spring of this year, a settlement, called New Switzerland, was made on the Ohio river, in Indiana, by emigrants from the Pays de Vaud, in Switzerland, under grants made by Congress to John J. Dufour, and his associates, for the purpose of encouraging the cultivation of the vine, and the making of wine. The grape culture was successfully carried on by them for a number of years, first, with Madeira, and other foreign vines, but to better advantage with the native Cape or Schuylkill grape,

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(1) Holland's Western Massachusetts.

the superiority of which to all others, as a wine grape, was long maintained by the founder of the colony.

The returns of exports, for this year, discriminated, for the first time, between Sea Island and other cotton. The amount of the former exported, was 8,787,659 lbs., and of other kinds, 29,602,428 lbs. The total value of this staple exported, was $9,445,000. The value of domestic manufactures exported, was $2,300,000.[1]

The total value of the real and personal property of the United States, exclusive of Louisiana, according to an estimate made by Mr. Gallatin, Secretary of the Treasury, for this year, was $2,505,500,000. The estimate included 1,000,000 slaves, valued at $200 each, and 10,000 flour, grist, saw, iron, and other mills, valued at not less than $400 each.[2] A tabular estimate, and classification of the whole population, for the same year, by Mr. Blodgett,[3] made the whole number of persons, in the Union, to be 6,180,000, of whom 1,866,000 were classed as active, or productive persons, and the aggregate money value of the whole people, $2,822,000,000. The entire number classed as mechanical artizans, was 500,000, of whom one fifth were active persons, and the estimated value of each of the class was $500, or $250,000,000 for the whole. The other classes were estimated as follows: slaves on plantations, 800,000, worth $200 each; slaves otherwise employed, 200,000, at $300 each; free planters, and agriculturists, 4,800,000, at $400 each; fishermen, 30,000, at $900 each; seamen, etc., 400,000, at $700 each; professional, and all other classes not enumerated, 250,000, at $500 each.

The annual consumption of British, and other dry goods, by the 6,000,000 of inhabitants, on an average of three years, was $35,000,000, and of all other foreign articles, $52,000,000, or, altogether, $87,000,000 in value of foreign articles. The produce of the sea and rivers consumed, was valued at $5,000,000, annually; of agricultural food, etc., $85,000,000; of domestic manufactures, $30,000,000; of all other produce, of the forest, etc., $12,000,000, making the total domestic consumption, annually, $219,000,000.[4]

The quantity of cotton manufactured in the United States, this year, was 1,000 bales, or double the amount consumed in the year 1800.

The cotton manufactory, established at Beverly, Mass., in 1787, about this time suspended operations, after having struggled with many difficulties, and sunk more than half its capital.

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(1) Seybert, 147; Pitkin, 116. Mr. Blodgett (Statistical Manual, p. 111), and the American Register (vol. 3, for 1808, p. 459), set down the value of manufactures exported this year, at $2,525,000. In Vethake's Ed. of McCulloch's Com'l. Dict. vol. 2, p. 42, it is placed at $2,445,000.

(2) Blodgett, p. 196.

(3) Ibid. p. 89.

(4) Ibid. p. 90.

The price for numbers twelve, sixteen, and twenty, of cotton twist yarn, at Pawtucket, R. I., was respectively, ninety-nine, 115, and 131 cents. The number of spindles in Slater's cotton mill was increased to 900.

The first agency in the United States, for the sale of American manufactures, was about this time established in Philadelphia, by Elijah Waring. He was the agent of Almy & Brown, of Providence, R. I. who consigned to him, for sale, cotton yarns and threads, in great variety. To these were added, as their manufactures improved, plaids, stripes, checks, denims, chambrays, tickings, etc. The depot for those articles was, for many years, a very small store, at No. 152 Market street. In 1812, Jeremiah Brown opened a second agency in the city, for Samuel Slater.

During the last four years the following vessels were built at Pittsburg, viz.: the ships Pittsburg, Louisiana, General Butler, and Western Trader; and the schooners Amity, Alleghany, and Conquest. The ships Monongahela Farmer, and Ann Jean,—the last, of 450 tons, in 1803,—were built at Elizabethtown, on the Monongahela.[1]

The number of iron furnaces in Pennsylvania, at this date, was sixteen; and the forges, thirty-seven. The slitting and rolling mills cut and rolled 1,500 tons of iron per annum. On the west side of the Alleghany mountains were eleven forges, estimated to make about 400 tons annually. There were about the same number of furnaces, some of which had failed for want of ore. About 2,000 tons of iron were annually made in Pennsylvania, and about the same quantity in Massachusetts.[2] Two charcoal furnaces, three forges, and a bloomery, were this year erected in Pennsylvania.

The Amesbury Nail Factory Company, in Massachusetts, was incorporated, with a capital of $450,000.

The New Hampshire Iron Manufacturing Company, at Franconia, was chartered in New Hampshire.

About this time, a gunpowder mill was established at Southwick, Mass., which is still in operation, and makes about 200,000 lbs. of powder annually.

The first carriage built in the United States, is said to have been made this year in Dorchester, Mass., by a man named White, for a private gentleman in Boston. It was an imitation of an English chariot,

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(1) Lyford's Western Directory for 1837. It is related that a Pittsburg ship, about this time, visited an East Indian port, and was about to be confiscated, because no such clearing port was known to the custom house officials. The captain, having traced out upon the map his circuitous route, backward to the head waters of the Ohio, obtained the release of his vessel.

(2) Morse's Geog., fifth ed. 1805.

but much lighter. Though creditable to the manufacturer, it was found difficult to compete with English and French carriages.[1]

The manufacture of silver-ware, which had been commenced in Providence, R. I., soon after the Revolution, by Messrs. Sanders, Pitman and Cyril Dodge, now employed four establishments in that town. These belonged to Nehemiah Dodge, Ezekiel Burr, John C. Jenckes, and Pitman & Dorrance, who were chiefly engaged in the manufacture, on a limited scale, of silver spoons, gold beads and finger rings. About this time they commenced the manufacture of cheap gold jewelry,—at the present time so extensively carried on there. They employed about thirty workmen in making breast-pins, ear-rings, watch keys, and other articles.[2] Mr. N. Dodge claims to have been the first in this branch, as early as 1794, and that the business was afterward started in Attleboro, by persons who purloined the secret from him.

The first settlement was made in Howard county, Missouri, at Booneslick or Mackay's Saline, near the mouth of the Great Osage river, by Major Nathan, son of Col. Daniel Boone, for the purpose of making salt, which has long been carried on there. Salt springs abound in the country, which also contains iron in abundance, lead, copper, zinc, sulphur, alum, copperas, saltpetre, and traces of silver, etc.

Patents were this year issued, among others, for the following objects, viz.: to Robert Crane, Jr., Waterbury, Conn. (May 4), for iron wheels; Isaac Baker, Amherst, Mass. (May 8), sawing shingles; Asahel A. Kersey, Hartford, Conn. (Oct. 9), for a shingle machine; John Bennock, Boston, Mass. (June 1), for a planing machine, the first recorded;

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(1) Although this is claimed to have been the first carriage built in America, the business in all its branches, appears to have been commenced in New York, as early as 1768, by two persons named Deane from Dublin (see vol. 1, p. 538). It was also carried on previous to 1790, in Philadelphia, on Arch st. between Fourth and Fifth, by George Bringhurst, coach and harness maker, who manufactured "all kinds of coaches, chariots, post chaises, phætons, coachees, waggons, curricles, chaises, kittereens, chairs, and whiskeys of the newest fashion, for home or abroad." Massachusetts, in 1754, was assessed on 1,355 carriages, including six coaches, and eighteen chariots toward a manufacturing fund. Virginia, in 1788, had 360 coaches, chariots, and phætons, and 1,549 one-horse chairs, besides waggons, etc. Philadelphia, in 1796, owned 307 four-wheeled carriages, of which thirty-three were coaches, and thirty-five chariots, in addition to 553 two-wheeled carriages. Yet in the year following, August, 1789, only $5,000 worth of carriages were imported. In 1801, the last year of the excise first laid on carriages by Congress, taxes were paid on 21,721 carriages. Indeed, the importation of carriages as stated in the Report of the Pennsylvania Society of Arts, before cited, had, at this date, nearly ceased. The duty on imported carriages, by the act of 3d March, 1797, was twenty-one per cent. *ad valorem*. In 1810, Virginia and a part of Massachusetts, returned 2,413 carriages, built in the year; from other states, there was no return of the number, but the value of the manufacture in seven states, was $1,449,849.

(2) Census of Providence, by E. Stone., M.D., 2d ed., 1856.

Alexander McNitt, Geneva, N. Y. (June 15), for separating and collecting sulphate of potash; Wm. Wing, Hartford, Conn. (August 28), casting types; Wm. King, and H. Salisbury, Hartford, Conn. (August 29), for carriage springs.

A company was formed for the manufacture of cotton, on a large scale, in the town of Pomfret, on the west side of the Quinnebaug river, in Conn. It consisted of James, Christie, and William Rhodes, 1806 brothers, of Pawtucket; Oziel Wilkinson, and his four sons, Abraham, Isaac, Daniel, and Smith Wilkinson, of North Providence, with his two sons-in-law, Timothy Green and William Wilkinson, of Providence. One thousand acres of land, lying partly in the three towns of Pomfret, Thompson, and Killingly, were purchased, for the double purpose of excluding taverns and the sale of liquors from the vicinity of their works, and to give employment to the parents of children employed in the factory. By these measures, and the early establishment of schools and Sabbath worship, for which purposes they erected a brick building in 1812, the demoralizing influences exerted by European factories were not experienced. Many of the operatives were able to lay up from $200 to $800, in three or four years. The establishment was known as Conger's Mills in Pomfret county. The capital invested by the company, from April 1, of this year, to October, 1808, was $60,000, of which five twelfths was in real estate.[1]

Samuel Slater, having, on account of the prosperity of his business, about this time invited his brother to come to this country, the village of Slatersville, in Smithfield, R. I., was projected by Almy, Brown & Slaters, with all the recent improvements in machinery, which Mr. John Slater was able to bring with him. In June, the latter removed to Smithfield as superintendent of the concern, which commenced spinning in the following spring, and was managed by him for upwards of fifty years, with uninterrupted improvement and profit, contributing to the large estate accumulated by Samuel Slater, in the cotton, iron, and nail business, in all of which he was engaged. The establishment at Slatersville, originally owned by the four partners in equal proportion, eventually became the sole property of John Slater, and the heirs of his brother. Within twelve years after the commencement of this factory, nine cotton mills, with 11,000 spindles, half of them in the factory of Almy, Brown & Slaters, a paper mill, two distilleries, two scythe factories, and manufactories of lime, whetstones, etc., rendered Smithfield a place of considerable importance; and the power loom,

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(1) White's Memoirs of Slater, 2d ed., 127.

dressing machine, and hydrostatic press, were there intr cloth business, by Mr. Gilmore, a few years after.

The Rensselaer Glass Factory, and the Hudson Mechanica were incorporated in New York, March 21.

The Legislature of Pennsylvania passed an act of the same d raise $7,000 by lottery, to enable the Vine Company to pay its de and accomplish the object of the Association.

Congress, April 18, in resentment of the frequent aggressions upon its neutral commerce, by the belligerent powers of England and France, and the impressment of its seamen by the former, and in vindication of the principle that free ships make free goods, prohibited the importation, after 15th November, from Great Britain, and its dependencies, or any foreign port, of all British manufactures, composed wholly or principally of leather, silk, hemp or flax, tin or brass; all woolen cloths invoiced above five shillings sterling per square yard; woolen hosiery; window glass; silver, and plated wares; paper of every description; nails and spikes; hats; ready-made clothing; millinery of all kinds; playing cards; beer, ale, and porter; and pictures and prints. On the 19th December following, the act was suspended until the 1st July, 1807, and the President was empowered to continue the suspension if he saw fit, until the second Monday in December of the same year.

Congress made additional appropriations of $150,000, for the fortification of the ports and harbors of the United States, and $250,000, for fifty additional gun boats for the protection of the harbors, coasts, and commerce.

The first official returns of exports from Ohio, were made this year, to the amount of $62,318.

The total value of domestic manufactures exported was $2,707,000.

Nov. 21.—Napoleon issued his Berlin decree, declaring the British islands in a state of blockade, and prohibiting all commerce, and communication with them. This, and the various other decrees, orders in council, and retaliatory acts, and instructions, by which the contending parties sought to cripple each other's power, together with the acts of non-intercourse and embargo, to which the United States were forced in self-defence, nearly destroyed the prosperous commerce of the Union, which reached its maximum the next year; but the interruption of its foreign commerce was attended by a corresponding increase in domestic manufactures.

The annual message of President Jefferson to Congress, stated that the revenue for the fiscal year amounted to nearly $15,000,000, and that during this, and the four and a half years preceding, upwards of $23,000,000, of the principal of the funded debt, had been discharged.

It recommended the continuation of the duties constituting the Mediterranean fund, about to cease by law, in lieu of the existing impost on salt. In view of a probable surplus in the treasury, after paying the regular instalments of public debt, the inquiry was made "to what other objects shall these surpluses be appropriated, and the whole surplus of impost, after the entire discharge of the public debt, and during those intervals when war shall not call for them? Shall we suppress the impost, and give that advantage to foreign over domestic manufactures?" On most articles it was believed the patriotism of the people would "prefer its continuance, and application to the great purposes of public education, roads, rivers, canals, and such other objects of public improvement as it may be thought proper to add to the constitutional enumeration of federal powers."

Three ships, the Rufus King, of 300 tons; the John Atchison and Tuscarora, each of 320 tons; the brig Sophia Green, of 100 tons, and two gun boats of seventy-five tons, were built this year at Marietta, Ohio.

Mr. Blodgett estimated the profit of capital invested in farm lands, at their current low prices, and in the necessary stock and labor—the latter being worth more than a bushel of corn per diem—to be more than double, with less labor, than that of the best mechanical employment suited to the country and the present habits of the people. The profits of the fishery and of agriculture were the principal causes heretofore, of a neglect of manufactures.

In Louisiana, near New Orleans, the lands were said to produce twenty bushels of corn per acre, worth about sixteen dollars. The same labor would give 250 lbs. of cotton, worth fifty dollars, and 1,000 lbs. of sugar, worth eighty dollars, with about seven dollars' worth of molasses.[1] The "Mexican" variety of cotton seed, the one chiefly cultivated there, at present, is said to have been, about this time, introduced in Mississippi, by Walter Burling, of Natchez, from Mexico, whither he was sent, this year, by General Wilkinson, on a mission connected with the western boundary question. It superseded the "upland" or black seed, first cultivated, and the "Tennessee" cotton.[2] It was no uncommon thing for a planter, in the year 1800, to sell his cotton crop for $10,000.

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(1) Statistical Manual, p. 91.

(2) Cotton was cultivated in Louisiana and the Illinois country, by the French, as early as 1722, in which year Charlevoix saw it growing in the garden of Sieur Le Noir, the company's clerk at Natchez, and it was sent down the river in boats, to New Orleans, in 1746, some years before its cultivation in Georgia. It is related that Mr. Burling, while dining with the Spanish Viceroy, in Mexico, requested leave to import some of the cotton seed of the country, which was refused, because forbidden by the Spanish government, but over his wine, the

The price of upland cotton in England, this year, was fifteen to twenty-one and a half pence sterling; of New Orleans, seventeen to twenty-four; Sea Island, thirty to thirty-seven; Pernambuco, twenty-three and a half to twenty-nine; Maranham, twenty-one and a half to twenty-six; Surat, seventeen; Demerara, twenty-two to twenty-six and a half pence.

The cotton manufactory at Pittsburg, in Pennsylvania, at this time, spun 120 threads at a time, with the assistance of a man and boy. The large cylinder of the carding machine had ninety-two pairs of cards, attended by a boy; the reeling was done by a girl. A wool carding machine was about to be erected there.[1]

The first paper mill in Ohio, was built this year, by John Beaver, Jacob Bowman, and John Coulter, on Little Beaver creek, just within the Ohio line. It was called "the Ohio Paper Mill," and was the third west of the mountains, the Redstone mill, and Cramer's, at Pittsburg, having preceded it.

The erection of the first paper mill in South Lee, was commenced by Samuel Church, on the present site of Owen & Hurlbut's mill. Lee is now the largest paper manufacturing town in the Union.

The water privilege on the north side of Chicopee river, was this year sold by Oliver Chapin, the first settler, to Wm. Bowman, Benjamin and Lemuel Cox, who erected a paper mill, in which paper-making was carried on by hand for fifteen or sixteen years, when they sold out to Chauncey Brewer and Joshua Frost, who continued the business five or six years longer. It then passed into the hands of David Ames, who introduced machinery, and became, in 1825, the most extensive paper manufacturer in the United States. His sons, David and John Ames, conducted the business until 1853, when the Lenox Chicopee Manufacturing Company became the proprietors.[2]

The first cargo of ice shipped from Massachusetts, was this year loaded at Gray's wharf, in Charlestown, on board the brig Favorite, purchased expressly for that purpose, by Mr. Frederic Tudor. The cargo, consisting of 130 tons from a pond in Saugus (Lynn), belonging to Mr. Tudor's father, was sent to St. Pierre, in Martinique, and was attended by considerable loss. Another shipment of 250 tons was made the following year, per brig Trident, to Havana. It was resumed after the war, and, in 1816, six cargoes of 12,000 tons were shipped, and in

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governor sportively accorded him permission to take home as many *Mexican Dolls* as he pleased, and the favor being well understood, was freely accepted. They are presumed to have been stuffed with cotton seed.

(1) Cramer's Almanac.

(2) Holland's Western Massachusetts.

1856 the trade had increased to 363 cargoes of 146,000 tons, from Boston to domestic and foreign ports.[1]

The first ark load of anthracite coal from Mauch Chunk Mountain, on the Lehigh river, in Pennsylvania, where it had been used for about fifteen years in blacksmiths' forges, was this year sent to Philadelphia, by William Turnbull, who had an ark constructed at Lausanne, which brought down two or three hundred bushels. It was sold to the Centre Square Water Works, but being found unmanageable, the experiment was not repeated for several years.

Two cotton mills were this year established at Cumberland, R. I., and two at North Providence.

Among the patents issued, were the following: Philip Bennet, Rochester, N. Y. (Feb. 8), a loom for weaving chips; Geo. Richards, Stonington, Ct. (Feb. 14), a dough machine; Israel Newton, Norwich, Vt. (Feb. 28), essence of tansy; Daniel Pettibone, Roxbury, Conn. (March 22), welding steel to iron; Abner Guild, Dedham, Mass. (March 31), carding wool hats: Richard Tripe, Dover, N. H. (April 1), a diving machine; Ephraim Hubble, Middlebury, Vt. (May 1), a water wheel, being the first of about 306 patents granted up to 1857, for water wheels, a greater number than for any other article; Standfast Smith, Suffolk, Mass. (June 12), three patents for extracting salt from sea water and for facilitating the process; Thos. Woodward (Aug. 7), manufacturing slates; B. A. De Carrendeffez, New York (Sept. 2), yellow paint.

1807

Congress prohibited, under heavy forfeitures and penalties, the importation of slaves into the United States, after the first of January, 1808, the earliest period at which such a law could take effect under the Constitution.[2] The near approach of the period in which Congress could constitutionally terminate all participation of American citizens in wrongs, "which the morality, the reputation, and the best interests of our country have long been eager to proscribe," was made the subject of congratulatory reference by President Jefferson, at the opening of the session. This inhuman traffic, which had never been legalized in some of the states, and had been discouraged or prohibited by several state and federal laws of earlier date,[3] was about the same time (March 25), formally abolished by act of Parliament, in England.

The duty on salt imported into the United States, raised by act of

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[1] See Report of Boston Board Trade, 1857, p. 79.

[2] Laws U. S., vol. 8, chap. 67. See acts of 22d March, 1794; 7th April, 1798; 10th May, 1800, and 28th Feb., 1803.

[3] See Tucker's Blackstone, Bk. 2, sec. 1. Walsh's Appeal, sec. 9.

July 8, 1797, to twenty cents per bushel, was repealed after 31st December, though several petitions were presented against its repeal The bounties granted by the same act, on salt provisions and pickled fish, were also taken off. The duties constituting the Mediterranean Fund, were continued until 1st Jan., following, and by subsequent acts to 1816. The product of the Onondaga Salt Springs this year, was 165,448 bushels.

The "American Botanical Society, held at Philadelphia," established in June, 1806, resolved to extend its inquiries to natural history in general, and took the name of the "Philadelphia Linnean Society," under the presidency of Professor Benjamin Smith Barton, whose "Elements of Botany," published in 1803, was the first elementary work on Botany, by an American. The Society, through separate committees on Mineralogy, Botany, and Zoology, was useful in acquiring and disseminating information respecting the natural productions of the country, and their uses in the arts and manufactures. (See A. D. 1810.)

The Philadelphia Society, for the encouragement of Domestic Manufactures, instituted in 1805, was incorporated (March 11), under the name of the "Philadelphia Domestic Society," with a capital stock of $10,000 in shares of fifty dollars each, with power to increase the stock to $100,000. The directors were empowered to make advances either in cash or raw materials, as might suit the applicants, upon all American manufactures, particularly those of wool, cotton, or linen, to the amount of one half the value affixed to the articles when deposited in the warehouse of the Society, and pay the residue when sold, deducting legal interest upon the money advanced, and a commission of five per cent. for selling. Money was lent to manufacturers upon good notes, at legal interest, and in that way the Society was believed to have accomplished much good. At the time of its establishment, it was ascertained that 500 weavers were out of employment, and were forced into other occupations. By the aid of the Society all found employment. During the first six years, the dividends—which were a secondary consideration with the stockholders—were six and sometimes eight per cent. The president of the Society was Paul Cox, and the warehouse was at No. 11 South Third street.[1]

The Hon. Robert R. Livingston communicated to the Agricultural Society of Dutchess Co., New York, a statement of the profits upon a flock of pure and mixed merino sheep, wintered at Clermont, in Columbia Co. The flock comprised five full blood merinos of the Rambouillet stock, imported by him, from which 28¾ pounds of wool were shorn, and sold to Mr. Booth for ten shillings per pound; twenty-four

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(1) Laws of Pa., vol. 8, chap. 1770.—Mease's Pict. of Phila., in 1811, p. 264.

three-quarter bred, which yielded 106 pounds of wool, sold at five shillings a pound (but worth eight shillings); and thirty half bred sheep which gave 139½ pounds of wool, sold for five shillings a pound. This was the first wool sold by him, and one of the first sales of that article in the United States. The net profit for the year, upon the sixty-four sheep, exclusive of the value of forty-three lambs, was £137 18*s*. Full blood ram lambs brought $100. Seven-eighth ewes were valued at $40, and rams at $50. A lot of seventeen common sheep, in the same flock, yielded 62½ pounds of unwashed wool, at 2*s*. 6*d*. a pound. Their keeping was attended with a loss, excluding the value of fifteen lambs. The quality of his merino sheep was found by Mr. Livingston, to have improved since their importation. During the next three years his stock was increased to the number of 645 sheep, from full to half blood, and 310 of the best American ewes, and half or three-fourth wethers. His example and counsel did much to turn the attention of farmers to the improvement of their breeds of sheep, and to prepare the way for an improvement in the woolen manufacture.

Sheep of the English breed, called the Bakewell, and mixed English and merino, had been recently introduced into Cheshire, Mass., notwithstanding the exportation of sheep from Great Britain had been made a penal offence, by act of Parliament (28 Geo. 3, Cap. 38). In the autumn of this year, Mr. John Hart, of Cheshire, offered half blood ram lambs, at thirty dollars per head.

About this time the Clermont, the first steamboat built by Messrs. Fulton and Livingston, which had been launched in the spring of this year, from the shipyard of Charles Brown, on the East river, was completed. Having been supplied with a steam engine built by Watt and Bolton, of Birmingham, England, she was moved across the stream to the Jersey shore, and soon after made her first trip to Albany, in thirty-two hours, returning in thirty hours, a distance of 150 miles. This interesting event, which demonstrated the practicability of stemming the current of the largest rivers by steam vessels, was witnessed by many astonished spectators, many of whom had, from the commencement of the enterprise, constantly predicted its utter failure, and treated the enterprising projector with open ridicule or the coldest reserve. The boat was soon after advertised, and established as a regular passage boat between New York and Albany; and by her success permanently introduced the era of navigation by steam. The state Legislature at its ensuing session, prolonged for the term of thirty years, the exclusive privileges previously granted the proprietors, and declared all attempts to injure or destroy the boat—of which some had already been made—to be public offences, punishable by fine and imprisonment.

About this time, an attempt was made by Jonathan Nichols and David Grieve, two ingenious mechanics of Providence, R. I., to propel a vessel by means of screws moved by horse power. A three mast vessel, called the "Experiment," about 100 feet in length and twenty feet beam, of light draught, built by Mr. John S. Eddy, by subscriptions in shares of fifty dollars each, and filled with machinery, constructed by Ephraim Southworth, was navigated from Eddy's Point to Pawtucket Village. The power was supplied by eight horses, and the boat made an average of four knots an hour with wind and tide, but without sails. She was stranded in returning, and there seized and sold by the sheriff to pay her cost, to Mr. John Peck, of Boston, the eminent naval architect, who designed to carry out the plan of the projectors. While being towed to Boston, this early "screw boat" was lost in a gale; but was considered to have proved the feasibility of navigating by propellers in the manner since so successfully carried out by Ericsson and others.[1]

A manufactory of a new article of patent floor cloth or summer carpet, was in operation in Philadelphia. Specimens of the manufacture were deposited in the wareroom of the Domestic Society, in Third street. It is described as strongly woven, for the purpose of the best floor, on a seven yard loom, without seam, of any peculiar size or shape. The carpets were furnished plain or in colors, with borders to match, at from $1.25 to $2.00 per square yard, according to the number of colors: and when partly worn, could be *recoated*, painted or ornamented, and with appropriate borders. By the same process, old woolen or worsted carpets could be coated on one side at half price, and baize or coverings for trunks and baggage, made water-proof. The manufacture appears to have been that at present known as Floor Oil cloth.

Blodgett's canal, around the Amoskeag Falls of the Merrimac, in New Hampshire, was, about this time, completed. It was one mile in length, and was commenced about the year 1794, through the enterprise of the Hon. Samuel Blodgett, who foresaw the immense value for manufacturing purposes, afforded by a fall of forty-five to fifty feet at that place, and expended a large fortune in the construction of locks, but died just before its completion. The manufacturing town of Manchester has grown up in consequence of the ample power obtained at this place, afterward rendered more available by the Amoskeag canal and other improvements.

The export trade of the United States, this year, reached a higher value than in any other year previous to 1838. It amounted to $108,343,150 in value, an increase, in sixteen years, of $89,331,109. The domestic exports amounted to $48,699,592, and the foreign, to

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(1) Hazard's U. S. Register, vol. 4, p. 293.

$59,643,558. Assuming the population to have been 6,300,000 persons, the domestic exports were in the proportion of $7.73; the foreign, $9.46, and the total, $17.19 for each individual. The total value per capita, of exports in 1790, was $4.84.

The domestic exports embraced manufactures, to the value of $2,309,000, cotton, about 66,200,000 lbs., worth twenty-one cents on an average, and valued at $14,232,000; and flour to the value of $10,753,000. The value of cotton exported was nearly $6,000,000 in excess of the previous year, and nearly $8,000,000 above the average of the previous ten years.

The total value of the imports was $138,500,000, exceeding that of any year previous to 1834, with the exception of 1816.

Between one and two thirds of all the exports of British produce and manufactures, during this and the preceding year, or £11,417,334 on an average of the two years, were believed to have been made to the United States. The value of cotton goods exported to the United States, from Great Britain (exclusive of Scotland), on an average of the same two years, was £4,393,449, or $19,000,000; and of woolen goods £4,591,487, or $20,000,000.[1]

This prosperous condition of the foreign commerce, attained, in a great measure, through the neutral position of the United States, in relation to the wars in Europe, had raised the whole tonnage of the Union to 1,176,198 tons.[2] The American tonnage employed in the foreign trade, as compared with that of all other powers so employed, was in the proportion of more than twelve to one.

The revenue, this year, reached nearly $16,000,000, and a surplus remained in the Treasury of $8,500,000, after paying, during this and the previous five and a half years, $25,500,000 of the funded debt, in addition to the current expenses and interest.[3]

But the foreign trade of the Union was about to be suddenly reduced to less than one third the present amount, through the measures of the foreign belligerent powers, among the most important of which, were the king's proclamation recalling all British seamen from abroad, and the British order in council, of November, restricting all direct trade with France and her allies, and declaring their ports (including all European ports but those of Sweden) to be in a state of blockade, to be visited only under certain restrictions, by vessels licensed to do so; and the French Milan rejoinder, declaring all ships, of tever nation, which

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(1) Report of Com. of Commerce and Manufactures, Feb. 13, 1816.

(2) Seybert. The actual tonnage of the Union on 31st Dec., 1807, including sea-letter, and all other vessels, as returned to Congress by the Secretary of the Treasury, was 1,268,548½ tons; and the total tonnage on which duties were paid during the year, was 1,450,585¼ tons.

(3) President's Message, Oct. 27, 1807.

submitted to the British orders in council, to be denationalized, and liable to capture as lawful prizes. These were followed by other decrees and orders, affecting neutral vessels.

For the protection of the ports of the United States, the president was authorized by Congress, to cause one hundred and eighty-eight additional gunboats to be built, or purchased.

As the safer, and more peaceful mode of inducing the belligerent powers to withdraw the orders and decrees, affecting the neutral maratime trade of the United States, and of protecting its seamen and ships from their operation, Congress laid a general embargo upon all vessels within the jurisdiction of the United States, cleared or not cleared, bound to any foreign place. All registered, or licensed coasting vessels, bound from one port of the United States to another, were required to give bond in double the value of vessel and cargo, and fishing vessels, in four times the value, to reland their cargoes in the United States. This act continued in force until January 1st, 1809, and in conjunction with the non-importation act assisted to complete the overthrow of the foreign commerce of the Union, during that time.

The new tonnage built this year, was 99,784 tons, from which amount it fell off to less than one-third in the following year.

At a session of the United States court, held in Georgia, in December, the first important decision was rendered by Judge Johnson, in the case of Whitney *vs.* Arthur Fort, for trespass upon the patent right of Miller and Whitney in the saw gin. A decree for a perpetual injunction was ordered against the defendant, but the decision did not terminate the aggressions. More than sixty suits had been brought in that state, before a single decision on the *merits* of Whitney's claim was obtained, and thirteen years of the patent had expired.[1]

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(1) Olmstead's Memoir, p. 46. The memorable decision of Justice Johnson, rendered on this occasion, contains the following remarks upon its utility. "The whole interior of the Southern States was languishing, and its inhabitants emigrating for want of some object to gain their attention, and employ their industry, when the invention of this machine at once opened views to them, which set the whole country in active motion. From childhood to age it has presented to us a lucrative employment. Individuals who were depressed with poverty, and sunk in idleness, have suddenly risen in wealth and respectibility. Our debts have been paid off, our capitals have been increased, and our lands trebled themselves in value. We cannot express the weight of the obligation which the country owes to this invention. *The extent of it cannot now be seen.* Some faint presentiment may be formed from the reflection that cotton is rapidly supplanting wool, flax, silk, and even furs, in manufactures, and may one day profitably supply the use of specie in our East India trade.

"Our sister States, also, participate in the benefits of this invention; for, besides affording the raw material for their manufactures, the bulkiness and quantity of the article afford a valuable employment for their shipping."

During the last three years, ten cotton factories were erected, or c menced in the state of Rhode Island,—five of them this year,—and one Connecticut, making fifteen in all, erected in the United States up to the close of this year. About 8,000 spindles were employed in them, and about 300,000 pounds of yarn were produced in a year.[1]

By the interruption of the foreign trade, and the suspension of imports, labor and capital began, from this time, to be more than ever directed to manufactures, and small manufactories of cotton were rapidly multiplied, particularly in New England, and near the original seat of the business. Efforts were also made to improve the machinery, and Hines, Dexter & Co., of Rhode Island, introduced an improved cotton picker, which was, however, superseded by a picker made by a Scotchman.

The Maine Cotton and Woolen Manufacturing Company was, this year, incorporated in Massachusetts, with a capital of about $100,000, and erected works at Brunswick, in Maine, where, in 1822, it employed 1,800 spindles, and thirty-two power looms, in the manufacture of sheetings.

In Pittsburg, Pa., which had rapidly advanced in manufactures and the mechanical arts since 1793, was, at this time, a cotton factory, belonging to Kirwin and Scott, which employed a mule of 120 threads, a jenny of forty threads, four looms, and a wool carding machine, under the same roof.

Among the other manufacturing establishments of that borough, were O'Hara's white glass works, producing to the value of $18,000 annually, and one green glass factory, upon the opposite side of the Monongahela; McClurg's air furnace; four nail factories, one of which made 100 tons of cut and hammered nails annually; two extensive breweries (O'Hara's and Lewis's), making beer and porter, which had already much of the repute which has ever since appertained to Pittsburg ale; two ropewalks (Irwin's and Davis's); three copper and tin factories; one wire weaving and riddle factory; one brass foundry; two earthenware potteries and a factory for clay smoking pipes; six brickyards; four printing offices and one copperplate printer. The following additional master workmen were enumerated in various branches: house carpenters and joiners, thirty-two; boot and shoemakers, twenty-one; blacksmiths, seventeen; weavers and tailors, of each, thirteen; mantua-makers, twelve; blue dyers, ten; butchers, eight; coppersmiths, cabinet-makers, tanners, seven of each; saddlers, milliners, bakers, hatters, six each; watch and clockmakers, and silversmiths, five; Windsor chair makers,

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Such a view of the benefits already conferred, and in prospect, from this great invention, should have been a sufficient rebuke to the sordid injustice inflicted by the people of that state upon the inventor.

(1) Gallatin's Report on Manufactures, April 17, 1810.

coopers, boat-builders, bricklayers, plasterers, five each; plane makers, house painters, four each; wagon makers, spinning wheel, spindle, and crank makers, stone cutters, stone masons, three each; gunsmiths, tobacconists, soap-boilers, book-binders, tinners, mattress makers, barbers, straw bonnet makers, ship-builders, looking-glass makers, booksellers, two each; of manufacturers of the following articles, one each; viz.: bells, scythes and sickles (five miles up the Alleghany), brushes, wool and cotton cards, wove stockings, cut glass, sails, upholstery, machinery and whitesmithing, cutlery and tools, ladies' shoes, split bottom chairs, leather breeches, gloves, trunks, horn combs, turnery, reeds, saddle-trees, flutes and jewsharps, pumps, ladies' lace, locks, harness and saddlery. starch. There were sixteen school teachers, four physicians, one gardener and seedsman, fifty store-keepers, and thirty-three tavern-keepers.[1]

An order was this year received from merchants in Calcutta, for sixty hogsheads of Philadelphia porter, some of which had been previously taken out and brought back uninjured. Among the principal manufacturers of porter, brown stout, and ale, were Robert Hare and son, the former of whom, in connection with J. Warren, both previously of London, was the first to introduce the manufacture of porter at Philadelphia, just previous to the Revolution.

The article was regarded as in all respects superior to English malt liquor, as it contained no other ingredients than malt, hops, and pure water, while the English article, on account of the exorbitant duty upon hops and malt, was extensively sophisticated with tobacco, aloes, liquorice, quassia root, and green vitriol.[2]

The manufacture of artificial Carbonated Mineral Waters, was, about this time, first introduced in this country, at Philadelphia, by Mr. Joseph Hawkins. With patent machinery of his own invention, and an improvement upon the process employed abroad,[3] the business was first commenced by Cohen & Hawkins, at 38 Chestnut st., and soon after, more extensively by Shaw & Hawkins, at 98 Chestnut st., the latter furnishing capital for the business. Abraham H. Cohen established a separate business at

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(1) Cramer's Almanac; Lyford's Western Directory.

(2) Mease's Pict. of Philadelphia.

(3) Acidulous waters of this kind are believed to have been first artificially compounded by M. Venel, though in ignorance of their nature. This was first demonstrated, about the year 1767, by Dr. Priestly, to be due to the absorption of carbonic acid, or forced air, as it was called, and he contrived an easy method of effecting the impregnation. About the same time an unsuccessful attempt was made, by a person named Owen, to manufacture mineral waters as a commercial article. The manufacture was successfully undertaken in London, in 1792, by J. Schweppe, previously of Geneva, encouraged by Dr. Pearson and others, and Mr. Hawkins made some improvement upon his process. Appropriate apparatus was invented by Dr. North, and improved by others at an early period.

31 South Second st. These parties obtained testimonials from the most respectable physicians and chemists of the city, as to the purity and healthfulness of the waters made by them, which contained three and a half times the quantity of carbonic acid gas found in any natural springs. Artificial Seltzer, Soda, Pyrmont, and Ballstown waters were supplied by them at six cents the glass, and from one to two dollars per dozen bottles, according to size, and from the fountain, to subscribers, at $1.50 per month, or four dollars per quarter, for one glass daily.

Manufactories of shot had been lately established or revived in Philadelphia, with a fair prospect of superseding the importation of foreign shot. Lead found in Louisiana, and shipped from New Orleans, was chiefly employed. The patent shot tower of Paul Beck, on the Schuylkill, one of the earliest, was upon a large scale, being over 170 feet high, and very complete in its machinery.

An improvement in printing, the invention of Mr. Hugh Maxwell, was in use in three or more printing offices in Philadelphia. It consisted in the use of a roller, in place of balls, for inking type, and was estimated to save to each press, six dollars per week, in addition to the gain in time, and superiority of workmanship. The cost of the machine, complete, was $100.

Patent iron-bound boots and shoes were manufactured in Philadelphia, by Mr. John Bedford, by a process claimed to be a saving of three-fourths the labor, and by greater durability, of one half the leather required by the common method. Mr. Bedford offered patent rights for the county at $100 each, and for states, districts, and towns, in proportion. He continued the manufacture many years, and subsequently patented a process of nailing on the soles of boots and shoes. A patent was also granted this year (Feb. 10), to Samuel Milliken, of Lexington, Mass., for manufacturing boots and shoes with metallic bottoms.

A manufactory of carpeting, considered equal to the best imported, was established in Philadelphia, about this time, by Mr. John Dorsey.

The General Society of Mechanics of New Haven, was formed and incorporated (in October), to regulate and promote the mechanical arts, and to assist young mechanics by loans, etc.

A manufactory of hard metal buttons, recently established in Waterbury, Conn., by Abel Porter & Co, produced triple, double, and single gilt coat and vest buttons, in every variety of shapes, forms, and colors, and military and naval buttons, according to sample. The gilding of buttons, sword hilts, etc., was done by a workman from London.

Several patents were granted for making cut and other nails, brads, and tacks, of which the most important was the machine for cutting and heading nails by one operation, issued (Feb. 22) to Jesse Reed, of

Boston, who took one patent previously, and several afterward. His machine came into extensive use.[1] Samuel Milliken, of Lexington, Mass., a large morocco manufacturer, patented (Feb. 10) boots and shoes with metallic bottoms; Charles Fales, Worcester, Mass. (Feb. 11), manufacturing charcoal from peat; Sylvester G. Whipple, Hallowell, Mass. (April 17), bark for hats and bonnets; Ebenezer Jenks, Canaan, Conn. (April 18), fire brick machine; Jonathan Mix, New Haven, Conn. (Feb. 18), main spring for carriages. This was a spring of elliptical form, placed parallel to the axle, to which it was screwed in the centre, and was considered a great improvement in cheapness and convenience, over the ordinary imported high steel springs. Cornelius Toby, Hudson, New York, (May 7), a bark mill of iron; this was the first to supersede the old stone crushers, and, with few improvements, is the one still in use among tanners; Wm. Young, Philadelphia (May 20), manufacturing lasts; Simeon Glover and D. Parmelee, Newtown, Conn. (June 8), a mortising machine; Isaiah Jennings, New York (Nov. 20), thimbles for sailmakers, being the first of about thirty-five different patents received during the next thirty years, by the inventor of the patent burning-fluid.

1808 Petitions were laid before Congress by the Messrs. Paul and J. W. Revere, of Boston, melters and refiners of copper, and manufacturers of copper in sheets, bolts, nails, etc., for fastening ships, praying for a duty of seventeen and a half per cent. on copper in sheets,—in which they professed to be able to supply the United States,—and the free importation of old copper. Counter memorials from the merchants, copper smiths, and braziers, of New York and Philadelphia, representing that under the existing duty on manufactured copper, and the free admission of unwrought copper, foreign wares were seldom imported, but considerable quantities of domestic wares were yearly exported to the West Indies, and asking a repeal of the duty on spelter, old copper, brass, and pewter. Congress therefore enacted (March 4), that after 1st April, old copper, saltpetre, and sulphur, imported as raw materials, should be admitted duty free.

An act of Parliament (March 28), laid certain duties upon all mer-

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(1) Previous to Sept. 25, 1809, twenty-two of Reed's patent machines were put in operation at Malden, five miles from Boston, by Thomas Odiorne and associates, who purchased the patent. They were also concerned in two establishments in Pa., one on Chester creek, with ten machines, and the other on French creek (Phœnixville), where they were preparing to erect twenty machines. The three works, including buildings, machinery, etc., and two rolling and slitting mills, cost $90,000, and required an active capital of $75,000. The fifty-two machines, with sixty men and boys, were capable of making from the nail plates 1,500 tons per annum.

The machine was afterward adapted to cutting tacks, by Mr. Odiorne.

chandize exported from Great Britain under the regulations established by the orders in council of Nov. 11, 1807. Cotton wool was to pay a duty of ninety-nine pence sterling per pound; cotton yarn, two shillings; India cottons and muslins, twenty-five per cent.; bar iron, three pounds per ton; saltpetre, one pound and eight shillings per cwt.

Orders were published, in April, encouraging American citizens to violate the embargo.

April 14.—Parliament prohibited the exportation of cotton wool from the United Kingdom, until the end of the next session.

The importation of merchandise of American growth and manufacture, was, by act of Parliament (June 23), permitted to be made directly from the United States into Great Britain, in British or American vessels, subject to such duties only, as were payable on the like commodities imported from other countries.

April 8.—Mr. Gallatin, Secretary of the Treasury, in pursuance of a resolution of the United States Senate, of March 2, 1807, made an elaborate report on the subject of Public Roads and Canals.

It stated that a great number of artificial roads had been completed in the Eastern and Middle States, at a cost varying from less than $1,000 to $14,000 a mile. In the state of Connecticut alone, fifty turnpike companies had been incorporated since the year 1803. All the roads undertaken by them were turnpikes, of which thirty-nine, extending 770 miles, were completed. The most expensive, that from New Haven to Hartford, cost at the rate of $2,280 per mile. Its net income from tolls, was only $3,000. Thirty-two others, extending 615 miles, cost but $550 a mile, and gave a net income of $38,000, or about eleven per cent. Of six others, reaching 120 miles, no account was received. In Massachusetts, besides some turnpikes, several roads of a more expensive kind, costing from $3,000 to $14,000 per mile, had been built, but were less remunerative than those of Connecticut. The Salem road yielded six per cent., and another eight, but the others did not average over three per cent. The largest amount of capital invested in turnpikes, was in New York, where in less than seven years, sixty-seven companies had been incorporated with a nominal capital of nearly $5,000,000, for the construction of more than 3,000 miles of artificial roads. Twenty-one other companies, with a capital of $400,000, had been incorporated for the erection of twenty-one toll bridges. Twenty-eight turnpike companies, with a capital of $1,800,000, were known to have completed 900 miles of road, and had 200 more to finish. The cost varied from $1,250 to $10,000 a mile. In Pennsylvania, which was the first to build a turnpike road, many roads were completed or in progress, at a high cost, and two companies had been chartered to extend them to Pittsburg on the

Ohio, 300 miles from Philadelphia. Others were in progress toward the Genesee, and Lake Erie. Several had been undertaken at considerable cost, in New Jersey and Maryland, besides the United States turnpike, from Cumberland, in Maryland, to Brownsville. There were few south of the Potomac.

In regard to bridges the same difference was observed in favor of the more populous northern states, and, south of Pennsylvania, their want was much felt, even on the main post roads. In New England, and especially in Massachusetts, wooden bridges, uniting boldness and elegance, were erected over the broadest and deepest rivers. In Pennsylvania, and in some places more eastwardly, bridges with stone piers, and abutments, and wooden superstructure, were common, of which the Schuylkill Permanent bridge, erected by a company at a cost of $300,000, might be considered the first and most expensive example in the United States. A bridge had been recently thrown across the Potomac, three miles above Washington, wholly suspended on iron chains, without intervening piers, and was deserving of notice on account of its boldness, and comparative cheapness.

The report recommended the appropriation, from the public revenues, of $2,000,000 annually, for ten years, for the following objects of national importance, as perfecting the communication between different parts of the Union, viz.:

1. For canals across the several headlands on the Atlantic coast, except Cape Fear, and for a great turnpike road from Maine to Georgia.

2. To improve the navigation of the four great Atlantic rivers; for four first-rate turnpike roads across the mountains to the western rivers; for a canal around the falls of the Ohio; and the improvement of roads to Detroit, St. Louis, and New Orleans.

3. For inland navigation from the North river to Lake Champlain, and also to Lake Ontario; and for a canal around the Falls of Niagara. The aggregate expense of these works was estimated at $16,600,000, and $3,400,000 was proposed for various subsidiary improvements, to equalize to the several sections of country the advantages of the grand improvements proposed.

The report was accompanied by communications from Messrs. B. H. Latrobe and Robert Fulton, upon the relative cost and advantages of canals, turnpikes, and railroads. In reference to the latter, Mr. Latrobe observed, "Railroads leading from the coal mines (of Virginia), to the margin of James river, might answer the expense, or others from the marble quarries near Philadelphia, to the Schuylkill. But these are the only instances within my knowledge, in which they at present might be employed."

Much interest on the subject of internal improvements, was excited by the able report of the Secretary, and, about this time, the first distinct motion was made in the New York Legislature, by Joshua Forman, for the survey of a canal route between the Hudson and Lake Erie.

April 23.—Congress authorized the President to purchase sites for, and erect such additional armories, and manufactories of arms, as he might deem expedient, under the limitations and restrictions provided by law. The limitation of workmen to the number of 100 was repealed.

An appropriation was also made, of $20,000 annually, to provide arms and military equipments for the whole militia of the United States, in proportion to the number in each. Under these acts the public factories were enlarged, and supplied with additional machinery, and contracts were made with private manufacturers of arms. During the next eight years, 62,606 arms were delivered to the executives of the several states.[1]

Mr. Bibb, of Georgia, introduced in the House of Representatives, the following resolution; "That the members of the House of Representatives will appear at their next meeting clothed in the manufactures of their own country." Not meeting with general approval, it was withdrawn.[2]

Samuel Slater & Co., cotton spinners, of North Providence, announced for sale, by Samuel Haydock, 38 South Second st., Philadelphia, cotton twist and filling, brown and bleached, three-threaded bleached yarn, numbers eight to forty, and bleached cotton sewing thread, numbers twenty to forty, also checks and stripes, and tickings of superfine and middling qualities.

The steamboat Phœnix, built by John Stevens, was navigated from Hoboken, N. J., to Philadelphia, by Robt. L. Stevens, being, probably, the first steam vessel that ever navigated the ocean.

The Clermont, having been enlarged, resumed her trips as a passage boat between New York and Albany. Other boats were soon after built for the Hudson, and for steamboat companies formed in different parts of the Union. The New York Legislature this year extended the exclusive privileges of Fulton and Livingston to thirty years.

The total exports of the United States, for the year, were reduced to $22,430,960, of which $9,433,546 were of domestic productions, including manufactures to the value of $411,000, and cotton worth $2,221,000. The exportations were principally made in the last three months of the previous year, having been subsequently suspended by the embargo.

The manufactures of South Carolina were, at this time, very inconsiderable; but, while the privations created by the embargo were severely felt, Dr. Shecut, by a series of warm addresses published in the Charleston City

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(1) Seybert, 609, 610, 626. (2) Benton's Debates of Cong., vol. 3, p. 710.

Gazette, succeeded in arousing a spirit favorable to domestic industry. After several public meetings, an association, called the South Carolina Homespun Company, was formed, and soon after incorporated with a capital of about $30,000, to promote the manufacture of common domestic fabrics. A lot of ground was purchased, and a procession of 4,000 persons, and a still larger assemblage, attended the laying of the corner stone of the first edifice on a large scale, in that part of the Union, devoted to domestic manufactures. A congratulatory address was delivered by Wm. Loughton Smith, Esq., and approval and support of the measure was regarded as a test of patriotism.

Increased value had been given to the rice crop, within a few years, by the general use of mills for threshing and cleaning it, introduced and improved by the Messrs. Lucas, by Mr. C. Kinlock, of Georgetown, and Mr. Deneale, of Virginia. The Agricultural Society also offered gold and silver medals for various hydraulic machines, for agricultural purposes.

About this time also, the subject was pressed upon the people of Virginia, in an address issued at Richmond, signed by Messrs. W. H. Cabell, Wm. Wirt, Wm. Foushee, Sen., Peyton Randolph, and Thomas Ritchie, advocating such a system of domestic manufactures, as would render them independent of foreign nations. The address stated that it was possible, "even if the present attacks on our trade should blow over, Congress may adopt the policy of encouraging our own manufactures, by rather higher duties on the imported articles of Europe, if they should discover, from the experience of the intermediate time, that we have really the inclination and the spirit to clothe ourselves."

The President, in opening the second session of the tenth Congress, adverted to the fact, that the suspension of foreign commerce had impelled the country to apply a portion of its industry and capital to internal manufactures and improvements, to a daily increasing extent, and that "little doubt remains, that the establishments formed, and forming, would, under the auspices of cheaper materials and subsistence, the freedom from labor and taxation with us, and of protecting duties and prohibitions, become permanent."

A memorial to Congress, presented early in the session by ten manufacturers of twines and lines, in Boston, Charlestown, Plymouth, Salem, and Beverly, Mass., asking an increased duty upon these articles, with which they claimed to be able to supply the United States, as cheaply as they could be imported, but for the extended credit given the importers, states that they manufactured annually, from hemp, 46,000 dozen of lines, and from flax, 27,500 lbs. of twine.

The total tonnage of new vessels built this year, was only 31,755 tons, or about one-third that of the previous year. Ship-building was given up on the Ohio, in consequence of the embargo, only one schooner, of 100 tons, having been constructed at Marietta. Of the gunboats authorized by Congress, in December last, 103 were built during this year.

The first flint glass manufactory was established in Pittsburg, by Messrs. Bakewells & Co., who met with many difficulties in discovering the proper materials, seeking and training workmen, etc., but succeeded in establishing an extensive business.

A steam flouring mill, calculated to run three pairs of stones, was also erected in the borough, by Oliver and Owen Evans, at a cost of $14,000.

The valuable water power of French creek, in Chester Co., Pa., was, at this time, appropriated by the erection of a large cut nail factory, and rolling and slitting mill, where the manufacturing borough of Phœnixville now stands. The works were principally owned by Mr. Longstreth, who, in connection with Thomas Odiorne, of Malden, Mass., erected twenty of Jesse Reed's machines for cutting and heading nails at one operation. Ten of these machines were previously put in operation, by Mr. Odiorne, on Chester creek. The French creek works were subsequently owned, among others, by Lewis Wernwag, the distinguished architect of the Fairmount wooden bridge; by Messrs. Jonah and George Thompson, by whom new works were erected in 1822; and by Reeves & Whittaker, of whom Reeves, Buck & Co., the present owners, are the successors. This was the commencement of an extensive nailing and iron business in the valley of the Schuylkill.

A series of articles were published in the Aurora newspaper, at Philadelphia, upon "the applications of chemistry in the arts and manufactures," by Dr. James Cutbush, afterward acting professor of chemistry in the United States Military Academy, and the author of a posthumous "System of Pyrotechny," and other works.

The Union Manufacturing Company, of Maryland, was incorporated with a capital of $1,000,000, in 20,000 shares, of fifty dollars each, owned by over 300 persons, including the state, which owned 200 shares, to carry on the manufacture of coarse cotton goods, on a large scale.

A site was selected upon the Patapsco river, ten miles from Baltimore, adjoining the lower mills and works of the Messrs. Ellicott. A dam was built of timber, 170 feet wide, and a canal 514 rods in length, affording water power for eight mills of the largest class. Two mills were erected 110 by forty-four feet, five stories high, and adapted for 10,000 spindles, with the requisite water looms. The first mill commenced running in May, 1810, and continued until Dec., 1815, when its machinery, consisting of 6,000 spindles and their appendages, was destroyed by fire. The second mill was started in July, 1814.

The Washington Cotton Manufacturing Company, with a capital of

$100,000, in shares of fifty dollars each, was incorporated about one year after the Union, and erected works on James Falls, five miles from Baltimore. It was confined to spinning cotton by water power.

The manufacture of cotton was rapidly increasing in Rhode Island, and the adjoining states. The following mills were this year established in Rhode Island: the Potowomut company, at Warwich, one at South Kingston, and one at Coventry; one at Rehoboth, Mass., and one at Sterling, Conn. The Pawtucket mill of S. Slater was still the largest in the Union.

Shoes began this year to be manufactured in Georgetown, Mass., where the business has since become extensive.

The high price of potash in Canada, where it is said to have risen, in consequence of the embarrassments of commerce, from $100 or $120 per ton, to $300, gave a great impulse to its manufacture in northern New York. Nearly the whole population of Essex Co. engaged in the manufacture and transportation of the article to Montreal, which was continued until the declaration of war, in 1812.[1]

The Laws of Louisiana (Territory), the first book printed west of the Mississippi, was published this year.

The manufacture of hats began at Plainfield, N. J., where it is still actively carried on.

The Emperor Napoleon, in order to create in France a rival industry to the cotton manufacture of England, which enabled her to carry on the war successfully, offered a premium of 1,000,000 francs, to any person, of any nation, who would invent a machine for spinning flax with the same facility that cotton was spun by machinery. The award was never made. John Dumbell took out a patent in England, in August, for flax spinning.

Barlow's Columbiad was issued in a style making it the most magnificent volume which had yet appeared in America. It was in quarto form, and was illustrated by engravings executed in London, several of which were designed by Robert Fulton, the friend of the author. The sale was quite limited on account of the high price, and was followed by a cheaper edition in the next year.

Among the patents issued this year, was one to Oliver Evans (Jan. 22), renewing by special act of Congress, for fourteen years, his patent of Dec. 18, 1790, for manufacturing flour and meal. An alleged informality in the old patent had caused a suit, in the courts of Pennsylvania, to be given against him, and otherwise deprived him of its benefits. Under the new patent, he claimed not only the exclusive use of the ma-

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(1) Watson's Ag. Sur. of Essex Co.

chinery specified, but also to prohibit the use of any other invention that should accomplish the same effect, however different in principle. He also advanced his charges for the use of his machinery, to many times the former rate, viz.: for the right to use it with a pair of stones four and a half feet in diameter, from thirty dollars to $300; and for a mill to run five pair of stones seven feet in diameter, $3,675, for which his former demand was only $200. Memorials were afterward presented to Congress for an amendment or repeal of the act, in which testimony was adduced that Evans was not the original inventor of any portion of the machinery.[1] Wm. B. Dyer, Baltimore (Feb. 27), a cordage spinning wheel; Reuben Ainsworth (May 14), making pearlash without ovens; Wm. Rhodes, New York (May 16), a floating dry dock; Caleb Johnston, New Glasgow, Va. (June 3), a double lever tobacco press; James Armour, Jr., Baltimore (June 27), spiral folding carriage springs; Abel Brewster, Hartford, Conn. (July 11), vitriolic test for bankbills; Stephen W. Dana, Rutland, Vt. (August 30), an improvement in carriages. This consisted in attaching a separate axle of iron to each wheel, and making it revolve with the wheel. It was supported near the wheel, by a metal box causing little friction, the other end resting also in a strong metal box under the body. A committee of the most respectable mechanics of neighboring towns, after fully testing it, bore public testimony to its value as an improvement. Elisha Callender, Boston (Oct. 3), lightning rods, the first for that object; Daniel Pettibone, Philadelphia (Oct. 28), stoves for rarifying air for warming houses by pure heated air. This improvement was soon after put in use in the Almshouse, and House of Employment, in Philadelphia, and Drs. T. C. James, Chapman, several members of Congress, and others, gave testimonials of its utility for general use, particularly for warming and ventilating churches, courts of justice, hospitals, manufactories, etc., of which it appears to have been the earliest attempt in this country.

1809 The first meeting in Pittsfield, Mass., to form a company to manufacture fine cloth and stockings, was held in January, when it was *resolved*, "that the introduction of spinning jennies, as is practiced in England, into private families is strongly recommended, since one person can manage by hand, by the operation of a crank, twenty-four spindles." Fine broadcloth had been made in the place for four or five years, by Arthur Scholfield, from the wool of merino sheep, recently introduced, for weaving which he received forty to sixty cents per yard.

The quantity of salt made at the Onondaga Salines, was about 300,000

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(1) Benton's Debates of Congress.

bushels annually. The domestic manufacture of salt in the United States had not, for several years, kept pace with the increase of population. At the Indiana or Wabash Saline, where the cost of manufacture did not exceed seventy-five cents per bushel, the market price of salt had not been less than two dollars a bushel, the quantity being short of the demand. The average annual importation of foreign salt,—much of it in ballast,—during the six years ending Dec. 31, 1807, was about 3,000,000 bushels of fifty-six lbs. each, exclusive of the quantities used in the cod fishery, and for pickled and salted provisions exported. The quantity in the country was considered very inadequate to the supply of the year, and the most eligible modes of meeting the deficiency were the relaxation of the commercial restrictions, or an increase of the Onondaga and sea shore manufactures, either by a bounty on the product, or by a renewal of the duty on foreign salt. The whole sea coast, from Maine to Georgia, afforded opportunity for the profitable employment of capital, with suitable protection. Extensive works were erected, during the next ten years, along the coast, particularly of North Carolina.

The manufacturers of salt in Massachusetts petitioned Congress for a duty on salt imported from abroad.

A report of the first Geological Survey of the United States, by William Maclure, dated January 20th, and published in the sixth volume of the Transactions of the American Philosophical Society, was the first work on the subject. It has been followed by those of Professor Cleveland, in 1816; C. Lyell, in 1845; and E. de Verneuil, in 1847.

Mining operations, which had been suspended by the Revolution, were resumed in the lead mines at Southampton, Mass., by Perkins Nichols, Esq., of Boston. They were continued by him and others, especially David Hinckley, until the death of the latter, about 1828, when they ceased until 1852, at which time they were reopened by Stearns and Sturgess. The neighboring mines of Northampton were, about the same time, reopened.

The scarcity and high price of woolen goods created by the restrictions upon trade, at this time turned public attention strongly to sheep husbandry, and the domestic manufacture of wool. The few full blood Spanish merino sheep in the country, derived from the importations of Messrs. Humphreys and Livingston, speedily rose in price to $500 and even $1500 each, and fine merino wool from seventy-five cents to two dollars per pound. In the course of this year Wm. Jarvis, Esq., of Weathersfield, Vermont, the American consul at Lisbon, purchased 1,400 of the crown flocks of the Escuriel, sold by order of the French government,—which he shipped to this country. During this and the following year, he sent upward of 2,000 more pure merinos. These, with some importations by other parties, to the number in all of about 5,000 imported up to this time, soon reduced the price, and introduced the breeds widely throughout the country. A few of the full blood Paular stock of Mr. Humphreys, and their half blood descendants, had been introduced into Bennington Co., Vt., by Mr. Stoddard, of Rupert, soon after their arrival. A half blood buck from his flock had also been taken into Washington Co., N. Y., by Aaron Cleaveland, and this year the first full blooded buck was hired from Mr. Stoddard for fifty dollars, by Hon. N. Wilson, of Salem, for which he received the bounty of fifty dollars, offered by the state to the person who should introduce the first merino buck into each county,—a measure also recommended by the governor of New Hampshire, at the next session of its Legislature. The New York Assembly also further encouraged the woolen branch by offering premiums of silver plate, worth eighty, 100, and 160 dollars respectively, in addition to bounties from each county, for the three best specimens of narrow cloth, woven in families, and like premiums for the best samples, of 200 yards each, of cloth made by professed manufacturers.

The prize was awarded through the Society of Arts, and last year, was given to domestic cloth made from Mr. Livingston's three-quarter bred sheep. In 1810, the county premium was given to that from Mr. Cleaveland's quarter bred lambs. About this time also, Robt. Prince, a merchant of New York, purchased some of the Jarvis importation at $600 each, which were placed in charge of A. McNish, of Salem, and the half blood lambs were annually sold to neighboring parts. These were the first merinos in Washington Co. and the neighboring towns of Vermont, which are now among the most extensive wool growing districts in the Union, and still furnish specimens of unmixed merino stock. Select specimens of the Escuriel flock of Mr. Jarvis, were also introduced into Queens Co., Long Island, by Judge Lawrence and his Quaker neighbors, which were in high repute, and also furnished pure and grade bucks during the next ten years, to large sections of the Northern and Middle States.[1]

The efforts of agriculturists were not confined to merinos. Other improved breeds were obtained and propagated through individual enterprise, and the exertions of various local societies. Among these the Cattle Society of Philadelphia, instituted this year, and the Berkshire Agricultural Society, in Massachusetts, by establishing periodical exhibitions of farm stock, became prominent. A Merino Society was soon after formed in the Middle States.[2]

(1) Fitch's Agricultural Survey of Washington County.

(2) At the first semi-annual shows of the Cattle Society, held in July and October, sheep of the Merino, Irish, Tunis or Barbary, New Leicester or Bakewell, and Southdown

The possession of an improved quality of wool and the scarcity of woolens, also called into existence a number of small manufactories of various kinds of woolen goods, and notwithstanding the high price of material, many of them were profitably conducted until after the war. Several companies were this year formed in the interior of Massachusetts for this purpose, although one only, that at Byefield, the oldest in the state, was named in the report of Mr. Gallatin, presented to Congress early in the ensuing year, and containing particulars respecting fifteen woolen mills in the different states. The Northampton Woolen Manufacturing Company of James Shepherd & Co., was extensively engaged, from about this time, in manufacturing broadcloths and cassimeres. A mill started at Danville, Pa., about this time, is said to have yielded a net profit of forty per cent. on the capital stock. President Madison was this year inducted into office, in the first inaugural suit of American broadcloth.[1] Mr. Jefferson, who ordered sheep from Spain this year, in a letter to Col. Humphreys, likewise acknowledges the receipt of a piece of cloth from his manufactory "as good as any one would wish to wear in any country," presented, doubtless, like the former, in admiration of the foreign commercial policy of the distinguished recipient. That policy, however promotive of this and several other branches of domestic manufacture, was the subject of much complaint among the commercial classes, particularly of Massachusetts, and produced considerable jealousy and even hostility toward the manufacturing industry of the country.

The superior regard at this time generally bestowed upon the commer-

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breeds, were exhibited. A premium of fifty dollars was offered for the introduction into Philadelphia or Delaware counties of a full blood ram of the last named stock, and $100 to any person who would originate, by selection and admixture from native stock, a new breed that would fatten easily, and produce the most and finest wool. In October, a large sale of ninety-eight sheep and lambs, crosses between the Dishley or Leicester and common sheep, were sold at Flemington, N. J., by Mr Joseph Capner, for $927. Full blood bucks of that breed, valued for its fattening qualities, and the wool, which was esteemed for combing and the manufacture of worsted, let for $150 to $200 the season. Among the improvers of sheep in the Middle States beside Mr. Capner, were Miles Smith and Mr. Farmer, near New Brunswick, Mr. Caldwell of Haddonfield N. J., Dr. Mease and Mr. Thomas Bulkley, near Philadelphia, Mr. Dupont in Delaware, and others. Geo. Washington Custis, Esq., long a distinguished stock grower, had recently called public attention to a remarkable breed of wild sheep on Smith's Island, off the coast of Virginia, which were shorn twice a year, and yielded wool, when full grown, five to nine inches long, and superior in fineness to any in the world. Maryland, Virginia, and other states, were also improving their stock of sheep.

(1) The coat is said to have been made at the extensive factory of Col. David Humphreys, on the Naugatuck, at Humphreysville, in the town of Derby, Conn., from the wool of his merino flock, and the waistcoat and small clothes from fleeces of the Livingston flock in New York, presents from these gentlemen respectively. The manufacture of the material has, however, been also ascribed to Arthur Scholfield of Pittsfield, Mass., the pioneer in this branch of manufacture.

cial interests of the nation, which, with the agriculture of the country, had been greatly augmented and enriched during the long period of war in Europe, rendered it for some time difficult for the manufacturers to obtain that command of capital and aid from the monied institutions of the country, that was necessary to place their new enterprises at once upon a successful footing. The encouragement afforded by the tariff had been in general inadequate to the efficient protection of the home manufacturer against the products of the capital, skill, and cheap labor of Europe, brought to his doors by a plethoric commerce, and aided by long standing prejudice in favor of foreign manufactures. A change was, however, about to take place, both in the general appreciation of domestic manufactures, and in the disposition to encourage and promote them by individual example and effort. The household manufactures consequently were extended even more rapidly than those of regular factories, and the disposition to use them, which had become in part a necessity, was rapidly growing into a fashion. In the woolen and linen branches, particularly, the great mass of production was still of this character, evidence of which is furnished in the official report on the subject by the Secretary of the Treasury.

The letter of Mr. Jefferson, above referred to, and other correspondence of this date, are supposed to indicate a considerable change in his views regarding the measure of encouragement to be given to domestic manufactures, and the weight of his opinions went far to influence the general sentiment. The spirit everywhere aroused by the circumstances which had produced his favorite measure of the embargo, he supposed to be unchangeably in favor of the future independence of the country, in respect to the products of manufactures. About this time he wrote to Thomas Leiper, of Philadelphia: "I have lately inculcated the encouragement of manufactures to the extent of our own consumption, at least in all articles of which we raise the raw material. On this, the federal papers and meetings have sounded the alarm of Chinese policy, destruction of commerce, etc. . . . . This absurd hue and cry has contributed much to federalize New England; their doctrine goes to the sacrificing agriculture and manufactures to commerce; to the calling all our people from the interior country to a sea-shore to turn merchants; and to convert this great agricultural country into a city of Amsterdam. But I trust the good sense of our country will see that its greatest prosperity depends on a due balance between agriculture, manufactures, and commerce, and not in this protuberant navigation which has kept us in hot water from the commencement of our government, and is now engaging us in a war. That this may be avoided, if it can be done without a surrender of rights, is my sincere prayer."

To Governor Jay, a little later, he wrote: "An equilibrium of agriculture, manufactures and commerce, is certainly become essential to our independence. Manufactures sufficient for our own consumption of what we raise, the raw material—and no more. Commerce sufficient to carry the surplus produce of agriculture beyond our own consumption, to a market for exchanging it for articles we cannot raise—and no more. These are the true limits of manufactures and commerce. To go beyond them, is to increase our dependence on foreign nations and our liability to war."

On March 1st the embargo was repealed, and an act was passed interdicting all commercial intercourse between the United States and Great Britain, France and their dependencies, after 20th May. In case either belligerent should revoke or modify its offensive orders or decrees, the President was empowered to re-open, by proclamation, the trade with that country.

On assurances received from the resident British Minister, Mr. Erskine, that the British orders in council would be withdrawn after 10th June, the President (April 19) issued a proclamation suspending the non-intercourse act after that time, in so far as it related to Great Britain. Unusual joy and activity immediately took possession of all our seaports, preparatory to the resumption of trade between the two countries. But the British government having disavowed the act of its envoy, who was recalled, a second proclamation (Aug. 9) re-established the interdict, and diplomatic intercourse between the two countries soon after ceased.

On June 7th the House of Representatives adopted the following resolution:—

Resolved, That the Secretary of the Treasury be directed to prepare and report to this house at their next session, a plan for the application of such means as are within the power of Congress, for the purpose of protecting and fostering the manufactures of the United States, together with a statement of the several manufacturing establishments which have been commenced, the progress which has been made in them and the success with which they have been attended; and such other information as, in the opinion of the Secretary, may be material in exhibiting a general view of the manufactures of the United States."

Circulars calling for information on the subject, were issued from the Treasury Department on the 28th July, and the report was made in the following April.

The House also ordered the reprinting of Secretary Hamilton's Report on Manufactures, presented in 1791.

A petition from John Allen and other manufacturers of hemp into linen, asking, in view of a renewal of foreign importations, the interposition of Congress in behalf of manufactories created by the embargo, states that Kentucky already manufactured sufficient baling linen for the greater part of the cotton country; other factories were in course of erection, and several persons were extending their views to finer linen and sail cloth. The state could produce hemp for the whole Union, although much was imported.

The Committee of Commerce and Manufactures, to which was referred so much of the message of the President as related to the revision of the commercial laws for the purpose of protecting and fostering the manufactures of the United States, and also the petitions and memorials of sundry manufacturers of hats, of cotton goods, of hemp into linen, of shot, of woolen cloths and of salt, made a report to the House (June 21). They say that in giving "manufactures the support necessary to withstand foreign competition, skill, and capital, the committee had on all occasions endeavored to avoid the danger of fastening on the community oppressive monopolies;" and that, " A nation erects a solid basis for the support and maintenance of its independence and prosperity, whose policy is to draw from its native sources all articles of the first necessity." The committee recommended additional duties on the following articles: on ready made clothing and millinery, on cotton manufactures from beyond the Cape of Good Hope, on bed ticking, and on corduroys and fustians, two and one half per cent. ad valorem; on shot and other manufactures of lead, one and a half cents per pound; on salt eight cents per bushel.

The Hon. Richard Peters of Philadelphia, a zealous promoter of agriculture and the useful arts, communicated to the Philadelphia Society for promoting Agriculture a plan for the establishment, under the patronage of the Society, of a manufactory, warehouse, and repository of agricultural instruments and models—of which no general manufactory as yet existed. He argued that it would be a means of improving the manufacture and would at once satisfy and increase the already prodigious demand for such implements.

Sales were about this time made in Boston of the first Cotton Duck made in New England, if not in the world. Sail duck of flax and cotton, and cotton bagging, were already extensively made in Philadelphia and in Kentucky. The cotton sail cloth was made by Seth Bemis, Esq., an enterprising manufacturer of Watertown, and a pioneer in several branches of manufacture, who in March employed a Mr. Douglass to construct for him a twisting machine of forty-eight spindles, and, in October, had six English weavers employed at fourteen cents per yard. His first sales were at sixty-five cents per yard for number one, and fifty-eight cents for number two. Encouraged by his success, he increased the business during the next two years, employing as his selling agent Capt. Winslow Lewis, who, by his energy, and the use of the new article upon his own ships, contributed to bring it into notice.

The "Columbian Agricultural Society for the Encouragement of Rural and Domestic Economy," was organized (November 28), at Union Tavern, Georgetown, D. C., for the purpose of encouraging home manufactures and the rearing of domestic animals. The names of seventy gentlemen of high respectability were reported as subscribers, and Osborne Sprigg, Esq., of Prince Georges' county, Maryland, was chosen president. In December following, the standing committee appointed three premiums of $100, $80, and $60, respectively, for the best "two toothed ram lambs," and premiums of ten to thirty dollars for the best pieces of cotton fabrics suitable for men's coats or women's dresses, fancy patterns for vests, pantaloons or small clothes, for cotton counterpanes and stockings, and for hempen or flaxen sheetings, shirtings, table linen, stockings, and twilled bagging of hemp, flax, or cotton.[1]

The Athenian Society of Baltimore was formed during this year, and incorporated the next, for the establishment of a warehouse for the deposit and sale of domestic manufactures. The stock was $20,000, in shares of twenty dollars each. Goods were received for sale on commission, from individuals or large manufactories, and advances were made upon the deposits of small manufacturers. The goods were disposed of on liberal terms, in a manner and with an object similar to those of the Domestic Society of Philadelphia. The sales this year amounted to $17,608, and were much increased in the following years.[2]

In Washington county, Maryland, about eighteen small vineyards were under cultivation with American grapes, from cuttings obtained from Mr. Legaux at Spring Mill, near Philadelphia, and elsewhere. Each had produced several barrels of wine, and the cultivation was prosecuted with spirit, aided by several Swiss, Austrian, and other European vine-dressers.

The influence of the embargo in developing the internal resources and manufactures of the Union, was adverted to in the President's message, as well as in those of several of the governors to their respective Legislatures. President Madison observed, "In the cultivation of the materials and the extension of useful manufactures, more especially in the general application to household fabrics, we behold a rapid diminution of our dependence on foreign supplies. Nor is it unworthy of reflection that this revolution in our pursuits and habits is in no slight degree a

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(1) Amer. Register, ch. 7, p. 171.

(2) Niles' Register, vol. 1, p. 461, vol. 2, p. 335.

consequence of those impolitic and arbitrary edicts by which the contending nations, in endeavoring each of them to obstruct our trade with the other, have so far abridged our means of procuring the productions and manufactures of which our own are now taking the place."

The Governor of Pennsylvania says, "In proportion to the difficulty of access, to and commerce with, foreign nations, is the zeal and exertion to supply our wants by home manufactures. Our mills and furnaces are greatly multiplied; new beds of ore have been discovered, and the industry and enterprise of our citizens are turning them to the most useful purposes. Many new and highly valuable manufactories have been established, and we make in Pennsylvania various articles of domestic use, for which, two years since, we were wholly dependent upon foreign nations. We have lately had established in Philadelphia large shot manufactories, floor cloth manufactories, and a queen's ware pottery upon an extensive scale. These are all in successful operation, independently of immense quantities of cotton, wool, hemp, flax, leather, and iron, which are manufactured in our state, and which save our country the annual export of millions of dollars."

Governor Stone, of North Carolina, observes, "If therefore the native ingenuity and enterprise of our citizens can be properly aided, there can exist no doubt but they will, by the manufacture of our own materials into articles of necessity and convenience, soon render the state completely independent of supplies derived from foreign countries. The advances already made, and hourly making in this respect, afford a consoling presage of relief from the violence and injustice of the enemies of our government. We were content, if permitted to do so, to advance in the business of manufacture by the slow movements indicated and made necessary by the ordinary increase of our numbers, and the protection afforded by the duties necessary for the support of government. But the injustice of the warring nations of the world has driven us from this course, and our people find themselves now compelled to purchase foreign manufactures, and to sell our own surplus produce at prices induced by an unjustly and unreasonably restricted commerce, or to make such of these articles as their occasions require, for themselves. It therefore becomes one means of national defence, that the Legislature of our improving state should foster her infant manufactures, and to this end nothing can more favorably conduce than to facilitate the transportation of our products by opening and improving our roads, removing obstructions to the navigation of our rivers, cutting canals, etc."

Governor Irwin, of Georgia, says, "While articles of foreign manufacture, in consequence of their commotions, continue to rise in value and demand in proportion to the great scarcity among us of circulating which was that of Butler and Wheaton at Meriden, Massachusetts, to commence with 10,000 spindles. The others were at Attleborough, Northbridge, Meriden, and Swansea, Massachusetts, total capacity, including the first named, 13,000 spindles; two at Cranston, two at Smithfield, one at Scituate (2,500 spindles), one at Johnston, and one at Coventry, R. I., with an aggregate of 7,600 spindles, and one at Killingly and one at Plainfield, Connecticut, each 1,500 spindles. The whole number of spindles in operation in this region was 20,406, of which 14,196 were in Rhode Island, 4,820 in Massachusetts, and 1,390 in Connecticut.[1]

The cotton manufacture of Great Britain was estimated to employ 800,000 persons, and its annual value to amount to £30,000,000 sterling. Of this product the United States had for a number of years taken a greater value than the whole of continental Europe together. Parliament this year granted Dr. Cartwright £10,000 for his power loom, invented in 1787.

A power loom was about this time projected by Dr. Josiah Richards, while a student of medicine at Claremont, New Hampshire. He attempted to put it in operation by water power at the Byfield cotton factory in Massachusetts, but failed, through some defect in the machinery.

A manufactory of cotton and woolen machinery was established in Cincinnati about this time.

Two companies were incorporated in Massachusetts for the manufacture of glass, one of which—the Boston Crown Glass Company—commenced in 1789. In New York the Madison and Woodstock Glass Manufacturing Associations were also chartered. Two companies were incorporated in New York for manufacturing paints and other articles, one of them on a large scale at West Farms, twelve miles from New York. Charters were also granted in New York to the Union Cotton factory at Greenwich, Washington Co., and to the Pleasant Valley Manufacturing Company, whose factory had a capacity for 2,500 spindles.

A large manufactory of gunpowder was about this time established near Richmond, Va., by Brown, Page & Co. A suit was afterward brought against the superintendent of the works by Dupont de Nemours & Co., for purloining from their powder works, on the Brandywine, certain machinery, valued by them at $10,000, on which the superiority of their gunpowder was supposed in a great measure to depend. One powder mill in that county (Henrico), according to the marshal's returns the next year, made 60,000 pounds, or about one half of all that was made in Virginia by fifty-three mills. James Tweddel had also a powder manufactory on the Brandywine at this time, and Schott & Mandeville were manufacturers, near Frankford, Pa.

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(1) Gallatin's Report on Manufactures in 1810, *see post.*

The Hampshire Leather Manufacturing Company was incorporated in Massachusetts, with a capital of $100,000, chiefly owned by merchants of Boston, who purchased the extensive tanneries of Col. William Edwards and his associates, at Northampton, Cunnington, and Chester. These works had a capacity for 16,000 full grown hides, and employed three bark mills (with stones), three hide mills, and three rolling machines, all carried by water, and copper cylinders for applying heat in the extraction of the tannin. Most of the improvements were introduced by Mr. Edwards, who still continued to conduct the operations, receiving hides of the company on contract, at six cents per pound, and paying them one half the profits for the use of the establishment.

Letters patent were this year granted to four different persons for the manufacture of combs, viz. : to Moses Moss of Farmington, Conn. (Jan. 10), and to Timothy Stanley of Southington (July 6), for manufacturing hair combs ; to Nat. Jones of Southington (May 9), for making wooden combs, and to Robert Gedney of New York (June 26), for manufacturing combs from the hoofs of cattle; Samuel Green, New London, Conn. (Feb. 15), making paper from seaweed, and Francis Bailey, Salisbury, Pa. (July 31), for hot-pressing paper; Amos and William Whittemore, Cambridge, Mass. (March 3), a renewal of patent for making cotton and wool cards; Jesse Reed, Massachusetts (April 19), a wheel for cutting and heading nails ; Mary Kies, Killingly, Conn. (May 5), weaving straw with silk or thread; Ira Ives, Bristol, Conn. (June 24), the striking part of a clock; Thomas Newell, Sheffield, Mass. (July 7), astronomical clocks; Samuel Goodwin (July 7), balance pendulum clocks; Lemuel J. Kilborn, Pennsylvania (Oct. 12 and 13), the striking part of a clock, and casting wheels for clocks; Oliver Ames, Plymouth, Mass. (June 24), tuyere and water back ; N. Foster, Flemingsburg, Ky. (June 28), spinning hemp and flax, and Jacob Alricks, Wilmington, Del. (Oct. 11), a spinning machine; Jacob Perkins, Boston (June 26), polishing and graining morocco ; Burgiss Allison, Pennsylvania (July 6), distilling spirits from corn stalks ; Simeon Jocelyn, New Haven, Conn. (July 13), pruning shears—this was for the useful article still employed for lopping the outer and upper branches of trees by means of a pole and cord, &c., which, however, is said to have been previously in use in Germany; Abel Stowell, Worcester, Mass. (July 19), cutting wood screws; Ezra L'Hommedieu, Saybrook, Conn. (July 31), double-podded screw auger. The patentee informed the Secretary of the Treasury in November, that he made his own wire, from which a man and two boys could make per day three hundred weight of assorted screws superior to the imported, and it was thought the United States would soon be supplied by his cheap and simple process. Daniel French, New York (Oct. 12), patented a steam engine for boats, mills, &c., with vibrating cylinder. Under this patent several of the first boats on the Ohio were built and supplied with engines by the patentee. Joseph Coppinger, Beaufort, S. C., received (Nov. 21) a patent for distilling in cast-iron stills; Peregrine Williamson, Baltimore, Md. (Nov. 22), metallic writing pens, the earliest mention we have seen of such pens; Samuel Ellis, New Bedford, Mass. (Nov. 29), geometrical writing plates; George Huling, Shaftesbury, Vt. (Nov. 24), circular saw mill; William Russell, New Bedford (Dec. 1), mariners' compass.

During this year, also, nineteen patents were taken out for washing machines, simple and combined, for which during the previous two years about the same number were received. Between 1797, when the first one was issued, and 1857, about three hundred and thirty were obtained.

Congress appropriated $5,000 for the purpose of testing the practical value of torpedoes or submarine explosives, proposed by Robert Fulton, as a means of harbor defence. The Commissioners appointed for that purpose did not agree in their reports of the experiments.

In obedience to the resolution of the House, of 7th June, 1809, Mr. Gallatin, Secretary of the Treasury, submitted to the house a report in part on the subject of Manufactures. The report, though admitted to be in general incomplete and defective, contained much important information, which the approaching census, it was suggested, might afford an opportunity to render more detailed and accurate.

1810

The following manufactures were ascertained to be carried on to an extent which might be considered adequate to the consumption of the United States, as the value of their products, annually exported, exceeded that of the foreign articles of the same general class annually imported, viz.: Manufactures of wood, or of which wood is the principal material, leather, and manufactures of leather, soap and tallow candles, spermaceti oil and candles, flaxseed oil, refined sugar, coarse earthenware, snuff, chocolate, hair powder, and mustard.

The following branches were firmly established, supplying in several instances the greater, and in all, a considerable part of the consumption of the United States, viz.: Iron, and manufactures of iron; manufactures of cotton, wool, and flax; hats; paper, printing types, printed books, and playing cards; spirituous and malt liquors; several manufactures of hemp; gunpowder; window glass; jewelry and clocks; several manufactures of lead; straw bonnets and hats; wax candles.

Progress had also been made in the following branches, viz.: Paints and colors; several preparations and medicinal drugs; salt; manufactures of copper and brass, japanned and plated ware; calico printing; queens, and other earthen and glass wares, &c.

Many articles, respecting which no information had been received, were undoubtedly omitted, and the substance of the information obtained on the most important branches, was comprehended under the following heads:

Wood and Manufactures of Wood were all carried to a high degree of perfection, and supplied the whole demand of the United States. They consisted principally of cabinet ware and other household furniture, coaches and carriages, and ship building, of which last the average annual tonnage of vessels above twenty tons, built from 1801 to 1807, was 110,000. The annual exportation of furniture and carriages was $170,000. The value of the whole, including ship building, could not be less than $20,000,000 a year. Of pot and pearl ashes, 7,400 tons were exported annually.

Leather and Manufactures of Leather.—Tanneries everywhere existed, some of them on a large scale; one establishment employing a capital of $100,000. One third of the hides used in the great tanneries of the Atlantic states were imported from South America, and cost five-and-a-half cents a pound, while in England they cost seven cents. The bark to tan them cost in England nearly as much as the hides, but in America not one tenth as much. Some superior, or particular kinds of English leather and morocco, were imported, but 350,000 pounds of American leather were annually exported. Some of the American leather was of inferior quality, but it was generally better made in the Middle than in the Northern or Southern States. The tanneries of Delaware employed a capital of $120,000 and ninety workmen, and made annually $100,000 worth of leather. Those of Baltimore numbered twenty-two, of which seventeen had together a capital of $187,000, and tanned annually 19,000 hides, and 25,000 calf skins. Morocco leather was made in several places from sheep and imported goat skins, and deer skins—an article of export—were dressed and manufactured in sufficient quantity for the country.

The manufactures of leather were boots and shoes, harness and saddlery. The average importation of boots was 3,250 pairs, and of shoes 59,000 pairs, principally kid and morocco; and the exports of American boots 8,500, and of shoes 127,000 pairs. The shoe manufactures of New Jersey were extensive. Those of Lynn, Mass., produced 100,000 pairs of women's shoes annually. The value of all articles of leather was estimated at $20,000,000 annually.

Soap and Tallow Candles were principally a family manufacture. There were also several extensive manufactories in all the large cities, and in other places. Those of Roxbury, near Boston, alone employed a capital of $100,000, and made annually 370,000 lbs. of candles, and 880,000 lbs. of brown soap, and 50,000 lbs. of windsor and fancy soap, with a profit, it was said, of fifteen per cent. on the capital. The importations were 158,000 lbs. of candles and 470,000 lbs. of soap, and the exports of domestic candles 1,795,000 lbs., and of soap 2,220,000 lbs. The total value of the manufacture, including the household, was at least $8,000,000.

Spermaceti Oil and Candles.—Establishments existed at Nantucket and New Bedford, Mass., and Hudson, N. Y., which furnished for exportation a surplus of 230,000 lbs. candles, and 44,000 gallons of oil. Value of the manufacture about $300,000, but the exclusion from foreign markets had lately affected it unfavorably.

Refined Sugar.—The quantity annually made was estimated at 5,000,000 lbs., worth $1,000,000—the capital at $3,500,000. Some establishments had declined in business with the increase in their number. A renewal of the drawback of the duty on brown sugar was desirable, and had been the subject of a special report to the Committee of Commerce and Manufactures.

Cotton, Wool, and Flax.—I. *Spinning Mills and Manufacturing establishments.*—Fifteen cotton mills were erected (in New England) before the year 1808, working at that time almost 8,000 spindles, and producing about 300,000 lbs. of yarn a year. Returns had been received of eighty-seven mills, erected at the end of the year 1809, sixty-two of which were in operation and worked 31,000 spindles.[1] The capital required to carry them on, to the best advantage, was estimated at the rate of $100 for each spindle, including fixed capital, expenses, and all contingencies. Only about $60 per spindle was actually employed. The average consumption of cotton was about forty-five pounds, worth twenty cents per pound per spindle, and the produce about thirty-six pounds of yarn of different qualities, worth on an average $1.12½ per pound. Eight hundred spindles employed forty persons, viz.: five men, and thirty-five women and children. On these data it was estimated that the eighty-seven mills, including the twenty-five new ones to go into operation this year, and the increased machinery of the old ones, would, in 1811, produce the following results, viz.: eighty-seven mills would employ a capital of $4,800,000, and use 3,600,000 lbs. of cotton, worth $720,000. They would spin 2,880,000 lbs. of yarn, worth $3,240,000, and employ 500 men and 3,500 women and children, or 4,000 hands.

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(1) See the details under this head, A. D., 1809.

The increase of carding and spinning of cotton in regular establishments had therefore been fourfold in two years, and would be tenfold in three years. The principal establishments were in Rhode Island, and within thirty miles of Providence,[1] and their manufactures were chiefly bed-ticking, stripes and checks, ginghams, cloth for shirts and sheeting, and counterpanes. The same articles were manufactured in several other places, particularly at Philadelphia, where were also made, from the same material, webbing and coach laces (which had excluded, or would soon exclude the foreign articles), table, and other diaper cloth, jeans, vest patterns, cotton kerseymeres, and blankets. The manufacture of fustians, cords, and velvets, had also been commenced in the interior and western parts of Pennsylvania and Kentucky.

Some of the mills also carded and spun wool to a small extent, but that was chiefly done in private families and woolen factories.

Some information had been received respecting fourteen of these,[2] manufacturing each on the average, ten thousand yards of cloth yearly, worth from one to ten dollars a yard. Others were believed to exist, and it was known that there were several on a smaller scale in Philadelphia, Baltimore, and some other places. All their cloths, as well as those made in families, were generally superior in quality, though somewhat inferior in appearance, to imported cloths of the same price. The principal obstacle to the extension of the woolen branch was the want of wool, which was still deficient in quantity and quality, though daily improving through the introduction and general attention to merino and other superior breeds of sheep occasioned by the great demand for Wool.

Establishments for spinning and weaving Flax were few. One in the State of New York employed a capital of $18,000 and twenty-six persons, and spun and wove annually about 90,000 lbs. of flax into canvas and other coarse linen. Information had been received of two in the vicinity of Philadelphia, of which one produced annually 72,000 yards of canvas made of flax and cotton; in the other the flax was both hackled

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(1) See the details under this head, A. D., 1809,

(2) A woolen mill was established at each of the following places: New Ipswich, N. H.; Byefield, Mass.; Warwick and Portsmouth, R. I.; Humphreysville, Conn.; Poughkeepsie, N. Y.; two on the Brandywine, Del.; two at Baltimore and Elkton, and one at Frederick, Md.; three (and sundry smaller ones) at Philadelphia, and one at Germantown, Pa. The capital (when stated) was from three to twenty thousand dollars each; the number of hands from eight to twenty-nine, and the product from 5,000 to 27,000 yards annually. Those at Humphreysville, Poughkepsie, and one on the Brandywine, used merino wool, and made broadcloth chiefly, and some broadcloth was made at Baltimore. Cassinet (wool and cotton) was made in Philadelphia.

and spun by machinery; thirty looms were employed, and it was said 500,000 yards of cotton bagging, sail-cloth and coarse linen might be made annually.

Hosiery was almost exclusively a household manufacture. That of Germantown had declined, and it had not been elsewhere attempted on a large scale. There were some exceptions; Martha's Vineyard exported annually 9,000 pairs of stockings.

II. *Household Manufactures.*—By far the greater part of the cotton, flax and wool was manufactured in private families for their own use and for sale. The articles were principally coarse cloth flannel, cotton stuffs and stripes of every description, linen and mixtures of wool and cotton. Information from every state, and more than sixty different places, showed an extraordinary increase in the last two years and rendered it probable that about two thirds of the cloth, including hosiery, house and table linen, used by the inhabitants outside of the cities, was the product of family manufactures. In the Eastern and Middle States, carding machines carried by water were every where established and others were extended southwardly and westwardly. Jennies and other spinning machines, and flying shuttles, were introduced in many places, and fulling mills sufficient for furnishing all the family manufactures.[1]

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(1) In Delaware 150,000 lbs. of wool were annually spun and wove in private families. Large exportations of linen were made from the western counties of Pennsylvania, and some from Kentucky and several places in the Eastern and Middle States. In 1809, eighty thousand yards were brought to Pittsburg alone, for sale, and the looms in that town had increased since 1807 from seventeen to forty-four. In the lower counties of Virginia, North Carolina generally, and the upper counties of South Carolina and Georgia, almost the whole summer-clothing of all classes was of household manufacture, and the slaves were entirely clothed in that manner. The scarcity of wool alone prevented the winter clothing being made in the same way. Stores for the sale of foreign goods in Matthews County, Va., had decreased since 1802, from fifteen to one. And of 1500 persons attending a militia review in North Carolina, less than forty wore any thing but *homespun.*

In New Hampshire nearly every township of 200 or 300 families had a carding and fulling mill. The former cost about $500 each, and carded for seven cents per pound. Every farm house had one or more wheels, and every second house at least a loom for weaving linen, cotton and coarse woolen cloths, which was done by the women. From 100 to 600 yards of cloth were thus made yearly on an average in each family, without an hour's loss of farm labor. Flaxen cloth worth fifteen to twenty cents a yard, was sold to country traders, who sent it to the Southern States at a profit. There were about 140 fulling mills in New Hampshire, of which the average cost was $1,500. They received, for dressing about 6,700 yards each, on an average, $1,225, of which $600 was for labor and materials. The cost of manufacturing eighteen pounds of wool into twenty yards of cloth, was about $21.24 (or 106 cents per yard of three-quarters wide). It was finer than English cloth of six-quarters, which sold in the stores for $3.50 per yard, and was more durable. In Vermont were 163 fulling mills, and 1,040,000 yards of cloth and flannel, and 1,315,000 yards of cotton and flax were woven in families.

The value of all the goods made annually of cotton, wool and flax, was estimated to exceed forty millions of dollars.

Connected with this subject was the manufacture of cards and wire. Whittemore's card machine had completely excluded foreign cards. The capital employed in that branch was estimated at $200,000, and the annual consumption amounted, until lately, to 20,000 dozen pairs of hand cards and 20,000 square feet of cards for machines, worth together about $200,000. The demand in 1809 was double that of 1808, and was still increasing. The wire was imported, and serious inconvenience would attend a stoppage of the supply, although the manufacture might and would be immediately established to supply all demands if the same duty were laid on wire, now free, as on other articles of the same material. The annual consumption of wire for cards did not exceed twenty-five tons, worth $40,000.[1]

HATS.—The annual importations were $350,000, the exportation of domestic hats $100,000, and the manufacture therefore nearly equal to the consumption. The hat company of Boston estimated the manufacture in Massachusetts at four times the number required for the state. It otherwise appeared that a capital of near three millions was applied to the business in that state and the number of hats made was 1,550,000, of which 1,150,000 were fine hats, worth four dollars each, and 400,000 felt hats worth one dollar each. That it was profitable appeared from a late establishment on Charles river calculated to make annually 35,000 hats, at five dollars apiece, and to employ 150 men. In Rhode Island 50,000 hats, worth five dollars each, were made, exclusive of felts. New York and Connecticut manufactured more than they consumed, the largest factory being at Danbury, where 200 persons were employed, making hats to the value of $130,000. Vermont supplied its own consumption, and in Philadelphia 92,000 hats, worth five dollars, were annually made, in addition to 50,000 *country* hats, worth three dollars

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(1) Commmunications from Wm. Whittemore of Cambridge, and Abel Stowell of Worcester, accompanied the report. A. and W. Whittemore had fifty-five of their patent card making machines (the patent for which had been recently renewed for fourteen years). Of those thirty-seven were in use, and, with the apparatus to carry on the business, cost them about $40,000. The only imported article used was the wire, and that could be made as good and nearly as cheap here as in England. The Lake Champlain iron was found equal or superior for wire to any imported. The manufacture of iron and brass wire had been frequently attempted with success, but had been abandoned on account of the free admission of foreign wire. A duty on wire as on other manufactures of iron would cause, it was believed, a considerable investment in its manufacture, and produce an adequate supply for cards, screws, and other uses.—See Patents 1809.

each. In many places wool for coarse hats was scarce. The annual value of hats made was near ten millions of dollars.[1]

Paper and Printing.—Some foreign paper was still imported, but the consumption was chiefly of an American manufacture, which, if proper attention was paid to the preservation of rags, would supply the demand. Paper mills were erected in every part of the Union. There were twenty-one in the States of New Hampshire, Vermont, Rhode Island, and Delaware alone, and ten in only five counties of New York and Maryland. Eleven of the mills had a capital of $200,000 and 180 workmen, and made annually $150,000 worth of paper.

Printing was done equal to the demand. In addition to newspapers, a large item, all books for which there were sufficient purchasers, were printed in the United States. The manufacture of hanging papers and playing cards was also extensive, and that of printing types, of which there were two establishments, the principal one at Philadelphia, was equal to the demand, but had lately been affected by the want of regulus of antimony.

Manufactures of Hemp.—Annual importation of foreign hemp, 6,200 tons. In Massachusetts, New York, Kentucky, and several other places, its cultivation had been greatly promoted by the interruption of commerce, and would soon, it was believed, produce a sufficiency.

The manufacture of ropes, cables and cordage was equal to the demand. Exclusive of those in the seaports, the ropewalks in Kentucky alone were fifteen, consuming about 1,000 tons of hemp annually, and six new works were prepared for operation the present year. Manufactures of sail-duck, formerly established in Rhode Island and Connecticut, and at Salem, were abandoned or suspended by the high price of hemp and want of capital. Some was still made, and the species of canvas called cotton-bagging was manufactured in several places extensively. An establishment at Philadelphia employed eight looms and could make annually 7,000 yards of duck or 45,000 of cotton bagging. There were thirteen manufactories in Kentucky and two in West Tennessee. The five at or near Lexington made annually 250,000 yards of duck and cotton bagging.

Spirituous and Malt Liquors.—The spirits distilled in 1801 from

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(1) A manufactory of hats at Albany employed a capital of $8,000, and twenty hands, and made 1,600 hats worth seven dollars each, 1800 worth three dollars, and 3,000 worth one dollar each: total, 6,400 worth $19,600, at a profit of fifteen to twenty per cent. The net profit on fine hats at seven dollars was $1.06¼, on napped hats of first quality at five dollars $1.93, and of second quality at four dollars $1.16, and on felts sixty cents each. The materials were raccoon, beaver, muskrat and wool. The making and finishing cost $1.25 to $1.50.

grain and fruit (exclusive of the large gin distilleries in cities), was estimated at nine millions of gallons, and at this time at twelve millions, to which were to be added about three millions of gallons of gin and rum distilled in cities, making an aggregate of fifteen millions of gallons. Foreign spirits were however largely imported, and in 1806 and 1807 amounted to $9,750,000 a year, yielding a revenue of $2,865,000.

The annual importation of foreign malt liquors amounted to 185,000 gallons, and the exportations of American beer and cider to 187,000. The amount actually made could not be stated, but the breweries of Philadelphia were said to consume annually 150,000 bushels of malt, exclusive of numerous small establishments throughout the city. Extensive breweries existed in New York and Baltimore. The aggregate value of spirituous and malt liquors made could not be set down at less than ten millions.

IRON AND MANUFACTURES OF IRON.—The information received in this branch was imperfect. Iron ore was abundant, and numerous furnaces and forges supplied a sufficient quantity of hollow-ware and castings; but about 4,500 tons of bar iron were annually imported from Russia, and probably as much from Sweden and England together. The amount of bar iron used in the United States was vaguely stated at 500,000 tons, which would leave about 40,000 as American manufacture. Although the ore of Vermont, Pennsylvania, Maryland and Virginia, was of superior quality, and much of the iron made there equal to any imported, yet on account of the demand and want of attention, much inferior iron came to market, which made the want of Russia iron to be felt in some of the slitting and rolling mills. A reduction of the duty on Russia iron was asked for by several, but generally a high and prohibitory duty on English bar, slit, rolled, and sheet iron, was considered beneficial, that usually imported on account of its cheapness being made with pit coal and of an inferior quality. The manufacture of sheet, slit and hoop iron amounted to 565 tons annually, and the quantity rolled and slit in the United States was estimated at 7,000 tons. In Massachusetts alone, were thirteen rolling and slitting mills, in which about 3,500 tons of bar iron, chiefly Russian, were rolled or slit. A portion was for sheet iron and rods for wrought nails, but two-thirds of the whole quantity flattened by machinery in the United States was used in the manufacture of *cut nails*, which had extended throughout the whole country, and being altogether an American invention, substituting machinery to manual labor, deserved particular notice.[1]

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(1) The details on this subject were embraced in supplemental communications and the historical facts have been sufficiently stated in previous pages, under the head of

The annual product of that branch alone might be estimated at $1,200,000, and the expense of cut nails, exclusive of the saving of fuel, was not one third that of forging wrought nails. About 280 tons were already annually exported, but the United States still imported more than 1,500 tons of wrought nails and spikes, on which an increase of duty, with a drawback on cut nails exported, was generally asked.

Considerable blistered and some refined steel was made, but 11,000 cwt. were annually imported. The manufactures of iron were principally agricultural implements and the usual blacksmiths work. To these were to be added anchors, shovels and spades, axes, scythes and other edge tools, saws, bits and stirrups, and a great variety of coarser ironmongery; but cutlery and all the finer hardware and steel work, were almost entirely imported from Great Britain. Balls, shells, and cannon of small calibre, were cast in several places, and three foundries for casting solid those of largest calibre, with the proper machinery for boring and finishing them, were established at Cecil County, Md., near the city of Washington, and at Richmond, Va.; each of the two last could cast 300 pieces of artillery a year, and a great number of iron and brass cannon were made at the one near Washington. Those of Philadelphia and near the Hudson were not then employed. Several iron foundries made every kind of machine castings. The one at Philadelphia manufactured steam engines.

At the public armories of Springfield and Harper's Ferry, 19,000

patents, and elsewhere. The quality of cut nails was stated to have so much improved within a few years, and was so far superior to any English nails except fine drawn wrought nails, that the protection and patronage of government against the foreign article thrown upon the market at cost and charges, was alone wanting to its complete success. The quantity of nails and brads made in Massachusetts was estimated by a principal manufacturer to have averaged during the last three years 2,000 tons, of which 1,700 tons were cut and the residue hammered. The perfection attained in nail-cutting machinery at this time had by no means been reached without many signal failures; and the cost of bringing it to this state, when a machine would cut about 100 nails per minute, has been computed at more than one million of dollars. The report of Mr. Gallatin was instrumental in making its value better known to the public. During this year a patent was taken out in England by Joseph C. Dyer of Boston, then resident as a merchant in London, for the nail-cutting machinery invented in Massachusetts. The card-making machinery of that state was patented in England by the same person the next year.

The principal business of the rolling and slitting mills was the making of nail plates and rods for wrought nails, hoops, tires, sheet iron and sheet copper. The mills in Massachusetts were situated as follows: one at Dover owned by the Boston Iron and Nail Factory, composed of J. and S. Welles and R. Whiting; one at Plymouth by S. Spear, W. Davis, and N. Russell; one each at Dover, Beverly, and Amesbury, all incorporated, and owned in part by Wm. and S. Gray, and Osgood; one at Newton, by R. Ellis and Gen. Elliot and others; one at Norton; three at Taunton, by Leonard & Crooker and others; and two at Bridgewater. They rolled about 3,500 tons annually, but could make 7,000 tons.

muskets were made annually, and about 20,000 more at several factories, of which the most perfect was that near New Haven, all private establishments, except that at Richmond erected by the State of Virginia. These did not include gunsmiths employed in making rifles and other arms. Swords and pistols were made in several places.

The value of iron and the manufactures of iron produced, was believed to be from twelve to fifteen millions of dollars yearly. The importations, including bar iron and all manufactures of iron and steel, were estimated at near four millions.

COPPER AND BRASS.—Rich copper mines were found in New Jersey, in Virginia, and near Lake Superior, but were not wrought. The principal manufactures of copper were stills and other vessels, but copper in sheets and bolts was almost wholly imported, the only manufactory for that object, which was at Boston, not receiving sufficient encouragement, although $25,000 had been invested in a rolling mill and other apparatus. The reason was that these articles were imported free of duty, and the owners were principally employed in casting bells and other articles. Zinc had lately been discovered in Pennsylvania, and there were a few manufacturers of metal buttons and brass wares.

MANUFACTURES OF LEAD.—Lead was found in Virginia and some other places, but the richest mines were in Upper Louisiana, and also, it was said, in the adjacent country east of the Mississippi. They did not yet furnish, after supplying the western country, over 200 tons annually to the Atlantic states.

The importations of red and white lead were 1,150 tons annually; of lead itself and other manufactures, 1,225 tons. The principal American manufactures were those of shot and colors of lead. Of the first, two establishments on a large scale existed at Philadelphia, and another in Louisiana, which were more than sufficient to supply the whole demand, stated at 600 tons a year. Of red and white lead, litharge, and some other preparations of that metal, 560 tons were made in Philadelphia alone. The manufacturers asked a repeal of the duty of one cent per pound on lead, and an equalization of that on its manufactures, by charging all with the two cents per pound laid on white and red lead. Various other paints and colors were made in Philadelphia and elsewhere.

TIN, JAPANNED, AND PLATED WARES.—Tin-ware was extensively made, and Connecticut supplied nearly the whole United States with it, but the sheets were always imported. Plated-ware, principally for coachmakers and saddlers, employed seventy-three workmen at Philadelphia, where over $100,000 worth was made annually. Similar establishments existed at New York, Baltimore, Boston, and Charleston.

GUNPOWDER.—Saltpetre was found in Virginia and Kentucky, and some other of the Western States and Territories, but principally came from the East Indies. The manufacture of gunpowder was nearly, and could at any time be made quite equal to the consumption; the importation of foreign powder being only 200,000 lbs., and the exportation of American powder 100,000 lbs. annually. The manufactory on the Brandywine, which employed a capital of $73,000 and thirty-six work men, and was considered the most perfect, made alone 225,000 lbs. annually, and might make 600,000 lbs. if there were a demand for it. Two others near Baltimore had a capital of $100,000, and made 450,000 lbs., of a quality said to be equal to any imported. There were several other powder mills in Pennsylvania and other places, but the total amount manufactured was not ascertained.

Earthen and Glasssware.—Sufficient pottery of the coarser kinds was made everywhere, and information had been received of four manufactories of a finer kind lately established. One in Philadelphia, with a capital of $11,000, manufactured a species similar to that made in Staffordshire, England, and the others in Chester Co., Pa., in New Jersey, and on the Ohio, made various kinds of queensware.

Information had been received of ten glass manufactories, which employed about 140 glass blowers, and made annually 27,000 boxes of window glass of 100 square feet each; that of Boston made crown glass equal to any imported, all the others green or German glass, worth fifteen per cent. less; that of Pittsburg used coal, and the others wood for fuel.

The importations of window glass were 27,000 boxes, the extension of the domestic manufacture, which supplied precisely one half the consumption, being prevented by want of workmen. Some green bottles and other ware were made, and two works, employing together six glass blowers, had lately been erected at Pittsburg, and made decanters, tumblers, and every other description of flint glass of a superior quality.

Chemical Preparations.—Copper was extracted in large quantities from pyrites in Vermont, New Jersey, and Tennessee. About 200,000 lbs. of oil of vitriol and acids were annually manufactured in a single establishment at Philadelphia. Various descriptions of drugs were also made there, and in some other places; and the annual amount exported exceeded $30,000 in value.

Salt.—The salt springs in Onondaga and Cayuga, in New York, furnished about 300,000 bushels a year, and it could be increased with the demand. Those of the Western States and Territories supplied about an equal quantity—the Wabash Saline, belonging to the United States, making about 130,000 bushels. Valuable discoveries had also been made on the banks of the Kanahwa. But the annual importation of foreign salt was more than 3,000,000 bushels, and could not be superseded by American salt, unless it were made along the sea coast. The works of Massachusetts were declining, and could not proceed unless the duty on foreign salt was again laid. It was necessary to shelter the works from the heavy summer rains by light roofs, moving on rollers, which considerably increased the expense. The erection of 10,000 superficial square feet cost $1,000, and produced only 200 bushels a year. A more favorable result was expected on the coast of North Carolina, on account of the climate, and works, covering 275,000 square feet, had lately been erected.

Miscellaneous.—Of the other manufactures previously enumerated, information had been received of two only.

Straw bonnets and hats were made with great success. A small district in Rhode Island and Massachusetts exported to other parts of the Union to the amount of $250,000.[1]

Several attempts had been made to print calicoes, but the manufacturers did not seem able, without additional duties, to withstand foreign competition. Their difficulties were stated in the petition of the calico printers of Philadelphia, to Congress. Considerable capital was invested in an establishment near Baltimore, which could print 12,000 yards a week, and might considerably extend it if the profits and demand afforded sufficient encouragement.

From the information received, the Secretary was able with certainty to infer that the annual product of American manufactures exceeded $120,000,000. The raw materials, provisions, and other articles consumed by the manufacturers, probably created a home market for agricultural products, not very inferior to that which arose from foreign demand, a result more favorable than might have been expected from a view of the natural causes which impeded the introduction and progress of manufactures in the United States.

The most prominent of those causes were the abundance of land compared with population, the high price of labor, and the want of sufficient capital. The superior attractions of agricultural pursuits, the great extension of American commerce during the late European war, and the continuance of habits after the causes which produced them had ceased to exist, might also be enumerated. Several of these obstacles had,

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(1) This business was commenced in 1801 at Wrentham, Mass., (where it amounted to $100,000 at least), and other towns in Norfolk county were estimated to make an equal amount. Wrentham, Franklin, Medway, Medfield, Billingham, Walpole, Sharon, and Foxburg, were the principal places where it was carried on, but some towns in Bristol and Worcester counties also made considerable, and it had been commenced in other parts of the State. They were exported to all the principal cities, and to the West Indies.

however, been removed or lessened. The cheapness of provisions had always, to a certain extent, counterbalanced the high price of manual labor, and that was now in many important branches nearly superseded by the introduction of machinery.[1] A great American capital had been acquired during the last twenty years, and the injurious violations of the neutral commerce of the United States by forcing industry and capital into other channels, had broken inveterate habits and given that general impulse, to which must be ascribed the great increase of manufactures during the last two years.

The incidental support derived from duties on importations, the exemption from oppressive taxes, and from those systems of internal restrictions and monopolies, which impeded the freedom of labor in other countries, had also promoted the general prosperity of the United States, its agriculture, commerce, and manufactures, and must give them a decided superiority over those less favored in that respect. The only powerful obstacle to the success of American manufactures was the vastly superior capital of the first manufacturing nation of Europe, which enabled her merchants to give long credits, to sell on small profits, and to make occasional sacrifices. The information obtained was not sufficient to enable the Secretary to submit, in conformity with the resolution of the House, a plan best calculated to protect and promote American manufactures. The most obvious means were bounties, increased duties on importations, and loans by government.

Occasional premiums might be beneficial, but a general system of bounties was more applicable to articles exported than to those manufactured for home consumption. The system of duties might be equalized, and imposed to protect some species of manufactures, without affecting the revenue. Prohibitory duties destroyed competition, taxed the consumer, and diverted capital and industry into channels less profitable to the nation than those which individual interest could seek. A moderate increase was less dangerous, and if adopted, should be continued during a certain period; for the repeal of a duty once laid, materially injured those who relied on its permanency, as had been exemplified in the salt manufacture. As capital was the chief need, which bank extension only partially supplied, and for short periods, the United States might create a circulating stock, bearing a low rate of interest, and lend it at par to manufacturers, on principles similar to that formerly

(1) The diminution of manual labor in the cotton manufacture of Great Britain, by means of machinery, was about this time estimated as two hundred to one. The jealousy of spinners, weavers, and other operatives, was frequently manifested by riot and destruction of machinery.

adopted by New York and Pennsylvania in their *loan offices*. Five to twenty millions might be thus lent without material risk, and without injury to any part of the community.

In conformity with the recommendation contained in the foregoing report, Congress passed, May 1, an amendment to the act providing for the taking of the third Census, making it the duty of the marshals, secretaries, and their assistants, to take also, under the directions and instructions of the Secretary of the Treasury, an account of the several manufacturing establishments and manufactures within their several districts, territories, and divisions, and to return the same to the Secretary of the Treasury. It authorised him to appropriate for this service $30,000, out of the sum of $150,000 set apart by the previous act for taking the census, a sum understood to have been more than adequate to the expenses.

The entire population of the Union, by this enumeration, was 7,239,903.

The returns made upon the subject of manufactures, on account of the limited time allowed for taking the census, the absence of any formula or instruction to secure uniformity and completeness, and the reluctance or inability of many persons to give correct information, were necessarily irregular and discordant, as well as in many respects extremely deficient. The accounts from the different states and territories, and even from divisions of the same state, varied with the different views of the agents, their intelligence, industry and other qualifications, which rendered a comparison of the general results quite difficult. The returns fall far short of a full and reliable statement of the actual number and condition of the manufactures of the country. Those from Pennsylvania, Connecticut, Massachusetts, New York and Virginia, were the most complete, those from South Carolina the least so, but great deficiencies were apparent in all of them. A few examples out of many, which might be cited, will illustrate the nature and extent of some of those deficiencies, which have been since obviated, in a measure, by providing the agents of government with proper schedules for their guidance. No attempt was made, in general, to take an account of the capital, or raw material, the number of hands, or the cost of labor employed. The number of manufacturing establishments, or manufacturers, the machinery, and the quantity and value of the product of the regular and household kind alone were given, and these were frequently defective in one or all of the items. Thus the number of printing offices—stated by Mr. Thomas, a competent authority, at more than 400 in 1810—was returned by the marshals as 110. Bookbinders, calico-printers, and dyeing establishments were returned only for one state. No glass works were returned for Massachusetts, which had long made and exported glass of superior quality to other states. Bark mills were given for only one state; carriage-makers for three; blacksmith's shops for five; hatters for four; tin and copperware shops for two—and these the least considerable in that branch. The number of tallow candle factories in Massachusetts was not given, although that state was credited with nearly one-half the product in that branch, and the same was the case with morocco factories.

Notwithstanding their defects, however, the returns contained a vast amount of valuable information, which will be interesting in all future time, as the first systematic statement of American Manufactures in detail. The results were looked for with considerable interest, and the Committee of Commerce and Manufactures in the House proposed, so soon as they were in possession of them, to make them the basis of some measures for the benefit of the manufacturing interests. The returns were sent into the Treasury Department in November, 1811, and at the request of the above committee, one of its members, Mr. S. L. Mitchell of New York, examined them, and in a letter to the chairman, dated January 7, 1812, professed his inability, after several attempts, to arrange the materials in a compendious or useful form, on account of their heterogeneous character. He presented, however, some general facts, which were published subsequently,[1] and showed the value of the information embodied, and also expressed a wish to see them in the hands of some one who would extract it more fully. On the 21st February, Mr. Seybert, of Pennsylvania, moved in the House, that a person be employed to prepare and report at the next session a digest of the census returns of Manufactures, and in obedience to a joint resolution of both Houses, approved 19th of March, the Secretary of the Treasury, Mr. Gallatin, committed the documents for that purpose to the charge of Mr. Tench Coxe, of Philadelphia. From his valuable and well digested tables, completed in May, 1813, and published by Congress, we extract the following particulars of the leading branches of industry and general summaries of the entire product of manufactures in the Union and in the several states, territories and districts.

The marshals reported 21,211,262 yards of flaxen, 16,581,299 of cotton, and 9,528,266 of woolen goods made in families. The total amount of all kinds of cloths exceeded 75,000,000 yards. There were 1776 carding machines, by which 7,417,216 lbs. of materials had been

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(1) Amer. Med. and Philosoph. Register, vol. 2, p. 405. Emporium of Arts and Sciences, vol. 1, p. 68.

carded; 1682 fulling mills, by which 5,452,960 yards of cloth had been fulled; 372,743 spinning wheels; 122,647 spindles; 325,392 looms; one silk manufactory which made 1800 yards of silk, worth $1800; 842 hatteries; 153 iron furnaces, which manufactured 53,908 tons of iron; 330 forges, which made 24,541 tons of bar iron; 135 bloomeries; 316 trip hammers; thirty-four rolling and slitting mills which rolled and slit 9,280 tons of iron; four steel furnaces, which made 917 tons of steel; 410 naileries, making 15,727,914 lbs. of nails; 117 gun manufactories; 111 cutlery shops; 4,316 tanneries, producing 2,608,240 lbs. of leather in addition to morocco manufactories, making 44,053 dozen skins, and other dressed skins and leather, making a total value of $8,388,250; 383 flaxseed mills, making 770,583 gallons of oil; 14,191 distilleries, producing 22,977,167 gallons from fruit and grain, and 2,827,625 gallons from molasses; 132 breweries, making 182,690 barrels or 5,750,000 gallons; 11,755 gallons of grape and currant wine; eighty-nine carriage-makers, who made 2,413 carriages; 14,569 wooden clocks; thirty-three sugar refineries, in which 7,867,211 lbs. of refined sugar had been manufactured; 179 paper mills, producing 425,521 reams and 22,500 rolls of paper; four paper stainers which stained and stamped 148,000 pieces of paper-hangings; twenty-two glass works, which produced 4,967,000 square feet of window-glass and 14,600 bottles; 194 potteries; eighty-two snuff-mills; eight drug manufactories; 173 ropewalks, which made 10,843 tons of cables and cordage; 208 gunpowder mills, producing 1,397,111 lbs. of powder; eight print works, employing 122 hands; sixty-two salt works, making 1,238,365 bushels of salt; straw bonnets to the value of $606,058.

Among the establishments and products classed as of a doubtful nature were 2,917 wheat mills, 350 grist mills; 2,526 common saw mills, making 94,000,000 feet of lumber; ninety-one cane-sugar works, producing 9,671 hogsheads of sugar; 9,665,108 lbs. of maple sugar; 94,371,646 bricks (in three states); saltpetre, including the product of twenty-two caves in West Tennessee, 429,607 lbs.; forty indigo works (in Orleans Territory), making 45,800 lbs; and 489 lime kilns (in Pennsylvania and Rhode Island).

A SUMMARY OF THE TOTAL VALUE OF THE SEVERAL BRANCHES OF MANUFACTURES IN THE UNITED STATES, EXCLUSIVE OF DOUBTFUL ARTICLES, ACCORDING TO THE CENSUS OF 1810.

1. Goods manufactured *by the loom*, of cotton, wool, flax, hemp, and silk, with stockings	$39,497,057
2. Other goods of these five materials, spun	2,052,120

3.	Instruments and machinery manufactured—value $186,650, carding, fulling, and floor cloth stamping by machinery—value $5,957,816	6,144,466
4.	Hats of wool, fur, etc., and of mixtures of them	4,323,744
5.	Manufactures of iron	14,364,526
6.	Manufactures of gold, silver, set work, mixed metals, etc	2,483,912
7.	Manufactures of lead	325,560
8.	Soap, tallow candles, wax, and spermaceti, spring oil and whale oil	1,766,292
9.	Manufactures of hides and skins	17,935,477
10.	Manufactures from seeds	858,509
11.	Grain, fruit, and case liquors, distilled and fermented	16,528,207
12.	Dry manufactures from grain, exclusively of flour, meal, etc	75,766
13.	Manufactures of wood	5,554,708
14.	Manufactures of essences and oils, of and from wood	179,150
15.	Refined or manufactured sugars	1,415,724
16.	Manufactures of paper, pasteboard, cards, etc	1,939,285
17.	Manufactures of marble, stone, and slate	462,115
18.	Glass manufactures	1,047,004
19.	Earthen manufactures	259,720
20.	Manufactures of tobacco	1,260,378
21.	Drugs, dyestuffs, paints, etc., and dyeing	500,382
22.	Cables and cordage	4,243,168
23.	Manufactures of hair	129,731
24.	Various and miscellaneous manufactures	4,347,601
		$127,694,602

From a consideration of all the reported details, and a valuation of the manufactures which were omitted or imperfectly returned, the foregoing amount of $127,694,602 was by Mr. Coxe extended to $172,762,676, exclusive of doubtful articles. These last embraced such manufactures as from their nature were nearly allied to agriculture, including cotton pressing, flour and meal, grain and saw mills, horse mills, barrels for packing, malt, pot and pearl ashes, maple and cane sugar, molasses, rosin, pitch, slates, bricks, tiles, saltpetre, indigo, red and yellow ochre, hemp and hemp mills, fisheries, wine, ground plaster, etc., altogether estimated at $25,850,795, making the aggregate value of the manufactures of every description in the United States in 1810, equal to $198,613,474.

The returned and estimated values of the manufactures proper were assigned to the different states and territories according to the following table.

SUMMARY OF THE RESPECTIVE VALUES OF MANUFACTURES IN EACH OF THE STATES AND TERRITORIES OF THE UNITED STATES IN 1810, ACCORDING TO THE RETURNS OF THE MARSHALS, AND ALSO AS ESTIMATED BY MR. TENCH COXE, EXCLUSIVE OF DOUBTFUL ARTICLES.

	Value as Returned.	Value as Estimated.
Maine (District)	$2,137,781	$3,741,116
Massachusetts	17,516,423	21,895,528
New Hampshire	3,135,027	5,225,045
Vermont	4,325,824	5,407,280
Rhode Island	3,079,556	4,106,074
Connecticut	5,900,560	7,771,928
New York	14,569,136	25,370,289
New Jersey	4,703,063	7,054,594
Pennsylvania	32,089,130	33,691,111
Delaware	990,711	1,733,744
Maryland	6,553,597	11,468,794
Virginia	11,447,605	15,263,473
Ohio	1,987,370	2,894,290
Kentucky	4,120,683	6,181,024
North Carolina	5,323,322	6,653,152
East Tennessee	1,156,049	3,611,029
West Tennessee	1,552,225	
South Carolina	2,174,157	3,623,595
Georgia	2,743,863	3,658,481
Orleans Territory	814,905	1,222,357
Mississippi Territory	314,305	419,073
Louisiana Territory	34,657	200,000
Indiana Territory	196,532	300,000
Illinois Territory	71,703	120,000
Michigan Territory	37,018	50,000
Columbia (District)	719,400	1,100,000
	$127,694,602[1]	$172,762,676

Among the important publications issued at Philadelphia in the last and present year was the second volume of Wilson's American Ornithology, a work in seven volumes folio with colored plates. The number of volumes annually printed in the city was estimated at half a million. The printing offices numbered fifty-one, and the presses 158. There were upward

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(1) The marshals of several of the states represented the amount of manufactures to be much greater than was returned by their assistants; those of Rhode Island twenty-five to thirty-five per cent; those of Connecticut considerably greater; those of New York were *inofficially* estimated, and given to the Treasury in December 1811, at $33,387,566, including some articles of a doubtful class; the iron manufactured in Kentucky, and generally throughout the Union, was considered greater than reported; the various cloths and distilled spirits in South Carolina was thought to be double the value reported, and the manufactures generally as greater. Those of Georgia were considered decidedly too low.

of sixty engravers and employment for twenty more. The art of engraving had been much improved within a few years.

The number of newspapers printed in the United States was estimated at upward of twenty-two millions annually. The paper mills were estimated, by Thomas, at 185, viz.: New Hampshire, seven; Massachusetts, thirty-eight; Rhode Island, four; Connecticut, seven; Vermont, nine; New York, twelve; Pennsylvania, sixty; Delaware, four; Maryland, three; Virginia, four; South Carolina, one; Kentucky, six; Tennessee, four. Rags began about this time to be imported largely for the use of paper makers.

The repeal of the embargo was followed by considerable activity in ship building in Maine, New Hampshire, and Massachusetts, and about one hundred new vessels, chiefly ships, were launched within a few months in the two states.

The value of exports for the fiscal year rose to $66,757,944, whereof over fifteen millions were in cotton, upward of five in tobacco and nearly seven in flour.

The first lot of cotton goods printed in the United States, by engraved rollers and machinery driven by water power, reached Philadelphia, October 6th, from the Bleach and Print works of Thorp, Siddall & Co., about six miles from Philadelphia. The cylinder machine was brought from England during the last year by Mr. Siddall, and was the first to supersede the tedious process of block printing previously in use. One man and two boys were able to print ten thousand yards of cloth or fifty thousand children's handkerchiefs in a single day. Cotton and linen goods were stained and dyed of one color for various uses, by similar means, within the next two years. The manufacture of every description of cotton machinery was commenced about the same time at Holmesburg, near Philadelphia, by Alfred Jenks, a pupil and colaborer with Samuel Slater. He contributed many improvements during subsequent years, and the business is still extensively conducted by his successors.

Mutual Benefit Societies, or associations of the various classes of mechanics and tradesmen for mutual assistance, by the appropriation of small sums from their earnings to a common fund, for the support of the sick or needy, were a prominent feature in the social organizations of this period. Of these provident associations there were in Philadelphia, in addition to numerous societies for general and special charities, national and patriotic associations, the following, the most of them incorporated: The Carpenters' Society, the oldest, instituted in 1724; the Shipmasters', Pilots', and Mariners' Societies; Stonecutters' Company; Master Bricklayers' Society; Hair Dressers' and Surgeon Barbers' Society; Typographical Society; Master Tailors' Society; Provident

Society of House Carpenters; Master Mechanics' Benevolent Society; and similar societies of the Cordwainers, Journeymen Blacksmiths, Journeymen Tailors—who had two, the Hatters, Bricklayers, Master Coopers, and Journeymen Coopers. Similar societies existed in most of the principal cities and were annually increasing.

Public attention was also at this time invited, through a paper by Dr. Mease, in the "Archives of Useful Knowledge," to the importance of establishing a Bank of Industry, for the benefit of the laboring classes, similar to those known in Europe as "Banks of Savings." This appears to have been the earliest proposition in the United States to found a savings institution. They had existed for some years in France, and since 1804 in England, where Mrs. Priscilla Wakefield that year established the first at Tottenham, in Middlesex, and conferred an immense benefit upon the classes for whose use it was designed.

Philadelphia was at this date supplied with water through about thirty-five miles of pipe, made of wood of three or four inch bore, connected by cylinders of cast iron. The whole expense of the works to November 1, had been $500,000. The number of manufacturers supplied was 1922, being an increase during the year of 382.

The extension of useful manufactures and the substitution of domestic for foreign supplies, was mentioned in the presidential message, Dec. 5., as a subject of satisfaction, and "in a national view the change was justly regarded as of itself more than a recompense for their privations and losses resulting from foreign injustice, which furnished the general impulse required for its accomplishment. How far it might be expedient to guard the infancy of this improvement in the distribution of labor by regulation of the commercial tariff, was a subject which could not fail to suggest itself to the patriotic reflections of Congress."

The jewelry manufacture of Providence, R. I., employed about 100 workmen, and the product amounted to $100,000 annually.

Lapidary work and glass cutting were carried on by two or three persons in Philadelphia, one of whom, John Benson, from Europe, claimed to be the only regular bred lapidary in America.

A German named Eichbaum "Formerly glass cutter to Louis XVI., late king of France," is stated to have recently established his business in Pittsburg, where a six light chandelier, with prisms of his cutting, suspended in the house of Mr. Kerr, innkeeper, was supposed to have been the first ever cut in the United States. Three glass works in that town produced flint glass to the value of $30,000, and bottle and window glass worth $40,000. Among the manufactures of Pittsburg were the following articles of ironmongery: chisels, claw hammers, steelyards, shingling hatchets, drawing knives, cutting knives, shovels, tongs, buckles, gimlets, augers, squares, door handles, jack screws, files, stock locks, spinning wheel irons, axes, hoes, chains, kitchenware, &c., to the amount of $15,000. About 200 tons of cut and wrought nails of all sizes were made annually, and a manufactory of bridle bits and stirrups had been recently established. Six manufactories of tin, copper, and japanned ware, manufactured to the value of $30,000.

The Swiss colony at Vevay, Indiana, had eight acres of vineyard under cultivation, from which they made 2,400 gallons of wine, partly from the Madeira grape.

The manufacture of drugs and chemicals, such as aqua ammonia, sulphuric ether, sweet spirits of nitre, salt of tartar, benzoic acid, and refined saltpetre, was about this time commenced at Elizabethtown, N. J., by Innes & Robertson, who, three or four years after, began to make calomel and other drugs.

An extensive bed of Kaolin, or decomposed felspar, was found at Monkton, Addison Co., Vt., and a company was chartered for the manufacture of fine porcelain from it. The same mineral exists at Brookline, Windham Co.

Among other establishments incorporated this year was the Humphreysville Manufacturing Company, at Derby, Ct., having a capital of $500,000. The extensive broadcloth works of Genl. Humphreys, in whose honor the village and company were named, and a cotton manufactory at the same place belonged to the company. The Munson & Brimfield Manufacturing Company, on the Chicopee, in Hampdown county, Mass; and the following in New York: The Mount Vernon, Oneida (cotton), Ontario, Lenox, Utica and Geneva Glass, and the Oneida Iron and Glass Manufacturing Companies or Associations; the Galen Salt Company; the Manlius (cotton and woolen); the Oneida; the New Hartford (capital $200,000); and the Milton Manufacturing Associations. The last named was a large woolen manufacturing company, whose cloths soon acquired a high reputation. One of the first steam cotton mills in the United States was established within a few years after at Ballston, in the same town. The Home Manufacturing Company, in Rensselaer county; the Rensselaer Woolen and Cotton Factory; the Schoharie Paper Manufactory (Wood & Reddington), the New York State Company; and the New York Economical School.[1] The Powhatan Cotton Works, on Gwinn's Falls, six miles from Baltimore, were erected at this time, and incorporated in 1815.

The following were some of the patents issued this year: to John P. Spies, Baltimore, Md. (Jan. 8), for manufacturing horn combs and plating

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(1) Laws of New York.

with tortoise shell; David Williams 3d, Hartford, Ct. (May 28), ivory combs; and Eli Parsons, Bristol, Ct. (Aug. 16), socket hair combs; John B. Lawin and T. B. Wait, Boston (Feb. 1), circular printing press;[1] George Murray, Philadelphia (Feb. 15), a mode of engraving to prevent counterfeiting; and also to Jacob Perkins, Boston (June 16), for a mode of preventing counterfeiting. The forging of bank bills, which these inventions were designed to counteract, was very rife at this time, and was rendered easy by the rudeness of the art. The stereotype check plate, first patented by Perkins, in 1799, was thought to render it nearly impossible, and the Legislature of Massachusetts required all bank notes to be impressed by his process. His mode of transferring engravings from one plate to another, by means of steel roller dies, upon which he and Murray soon after conjointly patented an improvement, was, in 1808, applied to calico printing by Mr. Locket, of Manchester, England; and about the year 1820, after having been long in use in this country, his method of engraving bank notes was extensively introduced in England, by Perkins, Fairman, and Heath. Perkins's steam gun, tested in England near the same time, was invented about this date, but not patented. George Easterly, Richmond, Va., received a patent (Feb. 5) for making barilla from tobacco stems; Robert Lloyd, Philadelphia (Feb. 8), loom for weaving girth cloth; Mellen Battle, N. Y. (April 2), wheelwright's labor-saving machine; Amos Miner Marcellus, N. Y. (April 11), spinning wheel heads. This invention, first patented Nov. 16, 1803, and embracing a double geared great wheel and a horizontal little wheel, did not attract attention until 1804, when a partnership was formed, and a small manufactory, highly original and ingenious in its plan, was erected by Miner, Demming, Pierce & Co., who the present year, employed twenty hands, and made weekly from six to nine thousand of the patent accelerating wheel heads. The gain of velocity, in the spindle, by the accelerating wheel, was said to be as nineteen to nine, or more than double, and the saving of labor in spinning wool to be one third, in worsted one half, and for merino wool it was indispensable. It was also much employed for cotton and tow, and the wheel heads were extensively counterfeited in New England. Peter Lorillard, N. Y. (April 25), received a patent for manufacturing tobacco; John Nicholson (April 28), for casting metal screws; James Davis, Philadelphia (May 15), manufacturing suspenders; Henry Burke, Philadelphia (June 18), winding and spinning wire; Winslow Lewis, Boston (June 8), reflecting and magnify-

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(1) In July of this year a printing press on a new plan, more simple than any in use, and designed to secure, by means of a lever without a screw, greater power and speed, was completed, but not patented, by Benjamin Dearborn, of Boston, who had invented a wheel press about twenty-five years before.

ing lantern. This lantern was adapted for lighthouses, and Congress, two years after, authorized the purchase of the patent right, for the use of the United States, and a contract with the inventor, if it proved to be original, to erect them in all the lighthouses of the states and territories, for which purpose $60,000 were appropriated. Phineas Dow, Boston (July 12), patented a leather splitting machine; Elisha Winter, New Orleans (Sept. 4), double screw press; Elisha Perkins, Shrewsbury, N. J. (Sept. 16), elastic clear starch from wheat; Oliver Stetson and William Sebree, Georgetown, Ky. (Dec. 11), a screw auger; Leonard Beatty, Wilkesbarre, Pa. (Dec. 28), printing calico and paper.

CHAPTER III.

ANNALS OF MANUFACTURES.

1810—1820.

THE interruption of Commerce with the Baltic, by enhancing the price, had given a great impulse to the cultivation of hemp, and a considerable increase to its manufacture, which in Kentucky alone was this year valued at $500,000. Early in the third session, the House of Representatives, by resolution, instructed the Committee of Commerce and Manufactures to inquire into the expediency of encouraging the culture of hemp by protective impost duties or by prohibiting its importation, on which occasion Mr. Mitchell, of New York, stated his conviction that enough could be raised on the Genesee Flats and the Wallkill river, in that state, to supply the North, and in Kentucky for the South. In discharge of this duty, Mr. Newton, for the above committee, laid before the House (Jan. 21) a letter from the Secretary of the Navy on the subject. The discouragements arising from early inexperience, errors, and doubts of the fitness of the soil and climate, were stated to have been in a great measure overcome, and the quantity raised was yearly increasing. The crop was a very certain one, and yielded from $100 to $200 worth of dressed hemp per acre, with less labor and expense than tobacco and several other crops. The practice of "dew rotting" was strongly condemned as expensive and injurious to the fibre. The process and advantages of "water rotting," as practiced in Russia, were described and recommended, as all that was necessary to make American hemp equal to foreign, and probably secure its adoption for the use of the navy, in which dew-rotted American hemp was already used for running and standing rigging. The Secretary recommended an annual appropriation to enable him to contract for American watered hemp for the naval service. During the year large importations of hemp, amounting to 228,390 cwt., or nearly four times the amount of the previous year, were made, chiefly for Russia.

1811

Extensive manufactories of cordage, bale rope, bagging, etc., had been established in Louisville, Lexington, Shelbyville, and Frankfort, Ky., and the following quantities of raw material and manufacture had been sent down the Ohio in two months following Nov. 24, 1810, viz.: hemp, 400 lbs.; tarred rope, 479 lbs.; bale rope, 20,784 lbs.; rope yarn, 154,000 lbs.; thread, 1,484 lbs.; bagging, 27,700 yards; tow cloth, 4,619 yards. During the year 1810, 1,378,944 lbs. of hemp and spun yarn, worth, at fifteen cents per pound, over $206,000, passed through Pittsburg to the Baltimore and Philadelphia markets.

A lengthy and earnest memorial was at this time presented to Congress, from Lewis Sanders and one hundred and twelve other citizens of Lexington, Ky., praying for some more decisive encouragement to the internal industry of the country. The protection and support of government appeared to them to have been almost exclusively given to commerce and the fisheries by the immense sums expended in fortifications of the seaports, the establishment of a navy, expenditures occasioned by foreign intercourse, tonnage duties, bounties to fishermen, credits at the custom house, etc. To these they did not object; but while commerce had received an unnatural extension, manufactures had been left to struggle almost unaided with obstacles unknown to their foreign competitors. In the event of a peace, it would be wise, by a little judicious encouragement, to create a domestic market for the labor, capital, and produce, which would thereby be compelled to seek other channels. Petitions were also presented from the manufacturers of morocco leather in Charlestown and Lynn, Mass., for additional duties on the foreign article, or its prohibition. The former stated that 800,000 skins were annually manufactured in the United States, equal or superior to the best foreign, of which number 150,000 were made in Charlestown.

The Legislature of New York, in February, enacted a general law for the incorporation of manufacturing companies, under which most associations for that purpose were organized, until 1848.

On motion of Mr. Clinton, the Senate of New York passed a resolution, in which the House concurred, recommending all members of the Legislature to appear at the next session in cloth of American manufacture. In March of this year, the Emperor Napoleon established in France several depots of merino sheep, in order to encourage their increase, and during the same month a numerous meeting of noblemen and gentlemen was held in London, when it was resolved to establish a society to improve and extend the merino breed of sheep throughout the United Kingdom. Sir Joseph Banks was chosen president. These examples were speedily followed in the United States, where the supply of woolens, more than most other articles, was affected by the restrictive measures of the government, and the undeveloped state of the woolen manufacture, chiefly on account of the scarcity of wool. As an evidence of this inadequacy of domestic supply, it is said, the Secretary of War, during this year, being in need of only about $6,000 worth of blankets for the Indian department, was compelled to ask of Congress a suspension of the non-intercourse act to enable him to obtain them from England. The recent renewal of that act and the great demand for wool and woolens, led to the formation, during the summer, of the "Merino Society of the Middle States," which, on the 5th of October, held its first stated meeting, after its organization, at the farm of Mr. Caldwell, the president, near Haddonfield, N. J. Several hundred full-blood merinos were exhibited and the society soon after arranged and published a list of premiums, of from twenty to fifty dollars, to be adjudged in July following, for essays on subjects connected with sheep husbandry and for the best merino stock. Sheep of that breed sold at public auction, in Philadelphia, during the previous year, from $230 to $250 each, a lot of twenty-five having sold for $5900, and another lot of thirty-three ewes for $250 each, and bucks for $350 each. In the State of New York, where greater zeal was shown for their propagation, sums of $500, $1,000, and even $1500, were repeatedly paid during the same year. A translation of a complete treatise on Merino and other sheep, with plates, recently published at Paris by M. Tessier, inspector of the Rambouillet and other establishments in France, was this year printed at the Economical School Office in New York and published. A translation of another French work on the subject, by M. Daubenton, was published in Boston. These efforts manifested the strong interest taken in the subject at this time, and seemed to warrant the extensive preparations, completed this year, by the Messrs. Dupont & Bauduy, on the Brandywine, for the manufacture of superfine broadcloth, on a large scale.[1]

The United States this year exported 1,445,612 barrels of flour, worth $14,662,000, being more than double the value of the same article exported the last year. The total value of domestic exports amounted to $45,294,041, including manufactures to the value of $3,039,000.

The total importation from Great Britain was only £1,874,917 sterling, against £11,217,685 the previous year. Of the aggregate value of British produce and manufactures exported to all parts of the world during the seven years, from 1805 to 1811, the United States had received annually 20.11 per cent.[2] The substitution of the non-importation act for the embargo, caused exchange on England, which under the latter act had risen to nine per cent. above par—payable in English currency, which was ten per cent. below metallic money—to fall in the United States this year to twenty per cent. below par. A large influx of specie took place and a new impulse was given to improvements in agriculture, manufactures, and real estate.

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(1) Archives Useful Knowledge, vol. 1, p. 207; vol. 3, p. 193. (2) Seybert.

The quantity of Cotton produced throughout the world was estimated at 555,000,000 of pounds, of which 80,000,000 were the growth of the United States and valued at $12,500,000. Of the domestic product, 62,000,000 of pounds, valued at $9,000,000, were exported, being 31,000,000 of pounds and 6,000,000 in value below the exports of the last year. The cotton states produced as follows: South Carolina, forty; Georgia, twenty; Tennessee, eight; North Carolina, three; Louisiana, seven; and Alabama, two millions of pounds. The average price of all kinds in the United States was fifteen and one-half cents per pound. The best was raised in the valley of the Red river in Louisiana. The crops of blackseed cotton, in this and two following years, were nearly cut off by the "rot," in consequence of which, and of the low price of cotton, the attention of many was turned to sugar. In Georgia, sugar, wine, and oil, were attempted. Two pipes of excellent red wine were produced by Mr. John Cooper of St. Simons, and much sweet and castor oil was made on the sea-coast of that state. Samples of good Muscovedo sugar were made by Mr. Cooper and Mr. Thomas Spalding, on Sapelo Island, and by Mr. Grant.

Several attempts had also been made within the last few years to produce Opium from the white poppy. In Georgia, and some of the Northern States, good samples of the drug—which in 1808 rose to fourteen dollars per pound—were made, as well as oil from the seed.

The manufacture of Isinglass which also rose in price during the embargo to ten dollars a pound—was about this time recommended as profitable. Several samples had been sent to England before the Revolution, in consequence of premiums offered there for its manufacture in the colonies. Caviar made from the roes of different species of sturgeon—from the sounds or air-bladders of which, in common with those of other fish, the Icthyocolla or pure animal gelatin called isinglass is made—had long been an article of domestic manufacture and export.

The following summary was published of the principal manufacturing establishments in the city and county of Philadelphia, which contained at this period a greater number and variety of manufactures than any city in the Union. The population in 1810 was 111,210, that of New York being at the same time 96,372.

Looms, 273; spinning wheels, 3,648; oil mills, three; carriage shops, seventeen (value of work in 1810 $498,500); soap and candle works, twenty-eight; glue manufacturers, fourteen; distilleries, eighteen (gallons distilled in 1810, 1,283,818); sugar refineries, ten; ropewalks, fifteen; potteries, sixteen; tobacco and snuff mills, twenty-seven; copper, brass, and tin factories, forty-four; hatters' shops, 102; paper mills, seven; printing offices, fifty-one; cutlers' shops, twenty-eight; gun factories, ten; glass works, three.[1] To these may be added, from the official digest of the marshals' returns afterward published: looms with fly shuttles, 186; spindles in factories, 4,423; stocking looms and factories, 105; print works, eight; print cutting establishments, four; naileries, twenty; saw factories, two; bell founderies, ten; shot factories, three; morocco factories, seven; breweries, seventeen; blacksmith shops, 201; cooper shops, 124; drug mills, six; brush factories, twenty-four; drum makers, five; engraving establishments, sixteen; book binders, eighty-six; printing press factories, two; Spanish segar factories, nine (making 3,900,000 Spanish segars in addition to 26,900,000 American segars made); wheat mills, thirty-three; saw mills, seventeen; mahogany saw mills, twenty-one; brick-kilns, thirty; etc., etc.[2]

The total value of manufactures within the above limits was $16,103,869, and those of the whole state $44,194,740.

In Delaware and Pennsylvania, there were at this time seventy-six paper mills, with ninety-three vats.

An era in the commercial history of the Western States, was the construction at Pittsburg this year of the steamboat "New Orleans," the first that ran on the western waters. The boat was built partly by subscriptions in New York and Pittsburg, but chiefly by Messrs. Livingston & Fulton, and Nicholas I. Roosevelt; Mr. Roosevelt, in 1809, made a tour of exploration, to ascertain the practicability of navigating the Mississippi by steam, and superintended the building of the boat, aided by Mr. Stowdinger, engineer in chief of the North river boats. She was 138 feet long by thirty feet beam, and between 300 and 400 tons burthen. Her cost was $40,000, one-half of which was reimbursed by the *net* profits of her first year's business. She was wholly constructed at Pittsburg, engine, boiler, and machinery, and was launched in March. On the 29th October she left Pittsburg for New Orleans, and arrived at Louisville, upward of 700 miles below, in seventy hours. She was detained at the falls by low water for several weeks, during which she made several trips to Cincinnati, and in December proceeded on her voyage, arriving in New Orleans on the 24th, having received her first freight and passengers at Natchez. She continued to ply between New Orleans and Natchez, for which trade she was built, making the round trip in about seventeen days. until 1814, when she was wrecked, upon a snag at Baton Rouge.

In July of this year there were five steamboats running from New York to Albany, and one to New Brunswick, one on the Delaware, one on Lake Champlain, one on the Ohio (the Orleans), and one on the St.

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(1) Mease's Picture of Philadelphia.

(2) Coxe's Census Digest.

Lawrence. There were also building, on the St. Lawrence one, on the Hudson river as a ferry boat one, and two others for the associates of the Jersey Company, to run, according to contract with the city of New York, every half hour between that city and Paulus Hook. In these last the ingenious Fulton carried out the arrangements still observed in the ferry boats, including side cabin, rudder at each end to avoid turning, the floating bridge or coffer to facilitate landing, and contrivances to guide the boat into the dock, and to break the shock on reaching the bridge.

About this time also, Mr. Bell produced his steamboat, "Comet," on the Clyde, the only one at this time on the British waters.

The number of cotton factories in Rhode Island on 31st October, was thirty-seven, the number of spindles 32,786, with a capacity for running 56,257.[1]

Mr. Madison, in his first speech to the Twelfth Congress (Nov. 5), while recommending continued military and naval preparations, suggested that, "Although other subjects will press upon your deliberations, a portion of them cannot but be well bestowed on the just and sound policy of securing to our manufactures the success they have attained, and are still attaining, under the impulse of causes not permanent; and to our navigation the fair extent of which it is at present abridged by the unequal regulations of foreign governments. Besides, the reasonableness of saving our manufacturers from sacrifices a change of circumstances might bring on them, the national interest requires that, with respect to such articles as belong to our defence and our primary wants, we should not be left in unnecessary dependence on foreign supplies."

It was recorded as an instance of extraordinary dispatch that the message above referred to was received in Philadelphia on the 5th, by express, in nine and a half hours from Washington, and in Boston in sixty-four hours.

The tonnage of new vessels built during the year exceeded that of any previous one, and amounted to 146,691 tons of enrolled and registered vessels. In February, 9,145 tons were on the stocks at Philadelphia, and over 3,000 tons, including five ship-rigged vessels of 300 tons each, were built at Rochester, Mass.

About 500,000 pounds of lead were this year made and sold to traders by the Sac and Fox Indians, from the mines of Prairie du Chien, on the Mississippi, eighty miles above those of Dubuque, then owned by the natives. The ore was rudely smelted on piles of wood.

Some valuable salt works were already established at Mine river, on the Upper Missouri, under the management of Mr. Braxton Cooper.[2] The Columbian Chemical Society was formed in Philadelphia.

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(1) Stone's Census of Providence, etc. (2) Breckenridge's View of Louisiana.

In New York, sixty-six acts of incorporation were granted for manufacturing and industrial purposes, of which forty-seven represented a capital of nine millions of dollars. The following were chartered under the general act of the previous year, certificates of which were to be deposited with the Secretary of State, viz: the Manlius Cotton and Woolen Manufacturing; the Stanford Manufacturing; the Whitesboro Cloth Manufacturing (for weaving, dyeing, and finishing cloth); the Farmers' Woolen and Cotton Factory; the Manlius Glass and Iron; the Geneva Glass; the Elba Iron and Steel Manufacturing (capital $100,000, with extensive works on the Au Sable, in North Elba [Keene], Essex county, built by A. McIntyre and associates); the Mohawk Factory; the Ontario Manufacturing; the Rutland Woolen Manufacturing; the Newport Cotton Manufactory; and the Schenectady Manufacturing Companies and Associations. The following were incorporated by special acts of the Legislature: The Oriskany (woolen, at Whitesboro, Oneida co.); the Clinton Woolen; the Somerstown and the West Chester County Manufacturing; the Bristol Glass, Cotton, and Clay; the Jamesville Iron and Woolen Factory; the New York Sugar Refinery; the Chenango Manufacturing; the Columbia Lead Mine; the Cornwall Cotton Manufactory; the Montgomery and the Oldenbarneveld Manufacturing; and the Susquehanna Coal Companies, Associations, and Societies.

In conformity with resolutions of the House, in December, 1810, with a view to a revision of the patent laws, the Secretary of State, in January of this year, laid before the House a list of the patentees and their inventions, and a special committee reported a bill for a revision of all the acts upon the subject. The Massachusetts Association, for the encouragement of useful inventions, presented a petition in February, signed by its president and secretary, Benjamin Dearborn and John Fairbanks, praying for such a revision of the laws as should secure inventors more fully against infractions of their patent rights, and the wrongs to which they were subject by the exportation of copies of specifications, drawings, and models, surreptitiously obtained at the patent office for the purpose of securing patents in foreign countries.

From information afterward communicated by the Secretary of State, it appeared that the number of patents issued, from 31st July 1790 to 31st December 1811, was 1,613 (an average of seventy-seven annually during the twenty-one years), and the gross amount of fees received was $49,110. The sums received for patents had annually increased, and amounted in the present year to $6,810. The secretary was directed to make an annual report of the patents issued. Patents were granted this year to Archibald Binney of Philadelphia (Jan. 29), for a type mould for printers, which greatly expedited the manufacture of types, and was adopted in

Europe; and another (Feb. 4) to the same, for a process of smoothing or rubbing types; to Robert Fulton, New York (Feb 9), for improvements in the steam engine for boats and vessels; and to John Stevens of New York (May 21), for constructing steam engines for propelling boats; William Pond, Wrentham, Mass. (Feb. 28), for wove straw plait; Robert Hancock, and Edw. W. Carr, Philadelphia (March 1), a machine for cutting wood screws, which was put in operation in Philadelphia; Thomas Massey, Philadelphia (March 4), a water loom; Barzillai Russell, Hartford, Ct. (March 4), an improvement in warming rooms; Lyman Cook, Whitestown, N. Y. (March 28), four wheeled manual carriages; Cyrus Alger, Boston (March 30), a mode of casting large iron rollers for rolling iron; William Baley, Nelson county, Ky. (April 10), a stave and shingle machine. This machine, by which a man and boy could dress and joint the staves for 100 barrels, hogsheads, or casks, in twelve hours, was driven by one or two horses, and in 1815 was in full operation in Cincinnati, when the proprietors were preparing to export staves to New Orleans. It was equally adapted to shingles.[1] Barnabas Langdon and William Mowry, Washington Co., N. Y., patented a machine for shaving, jointing, and forming the staves and heads of barrels, which was put in operation in Whitehall, N. Y.; Eleazer Hovey, Canaan, N. Y. (May 20), a shearing machine, which sheared perfectly a yard of cloth per minute. It was manufactured at New Lebanon, N. Y.; Perkins Nichols, Boston (May 18), a rimming auger; Edward Ramsey, Christian co., Ky. (April 16), and five other persons severally during the year, took patents for machines for breaking and dressing hemp and flax; Josiah Noyes, Herkimer co., N. Y. (June 21), a steam stove for cooking; Samuel B. Hitchcock and John Bement, of Homer, N. Y. (July 30), manufacturing boots and shoes. This was a patent for pegging boots and shoes, which was thus early practiced in New York, and very generally in Connecticut, with much relief to the workmen, and with increased dispatch, durability, and neatness in the work.[2] It was probably the origin of that description of manufacture; Robert Hare, Philadelphia (Aug. 22), a mode of ripening and keeping malt liquor and cider—consisting of air-tight casks, fitted with a pneumatic cock, with two orifices, etc., and in general use in Philadelphia at the time; Charles Reynolds, East Windsor, Ct. (Aug. 21), propelling carriages by steam; Jacob Pierson, Knoxville,

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(1) A machine patented in 1807 by J. McIlvain, of Chester, Pa., for dressing shingles, by means of knives fixed in a wheel connected with a shaft, and turned by horse power, was in operation in West Philadelphia at this time. A man and boy could dress and pile away two thousand in a day, and by water power three thousand.—*Mease's Philadelphia.*

(2) Archives of Useful Knowledge, 3. 192.

Tenn. (Oct. 17), wooden screw press for cotton; Samuel Wetherell, Jr., Philadelphia (Oct. 29), for a mode of washing white lead, and another for setting the beds or stocks in making white lead; and to the same (Nov. 1), for screening and separating white lead, and also for separating oxidized from metallic lead, in the process of making red lead, and using a machine for that purpose;[1] Benjamin Bell, Boston (Nov. 6), sulphuric acid; Benjamin King, Washington, D. C. (Nov. 15), for welding steel, etc., by means of pit coal.

Early in the first session of the twelfth Congress, the Committee on Commerce and Manufactures were instructed to inquire into the expediency of encouraging the manufacture of iron, either by protecting impost duties, or by the prohibition of manufactures of that material. Petitions in favor of the measure were presented from the iron manufacturers of New Jersey, Pennsylvania, and New Hampshire, representing their inability to contend with the recent low price, induced by heavy importations from Russia. The directors of the New Hampshire Iron Factory Company stated that they had not realized one dollar upon a capital of upwards of $300,000 invested in their works at Franconia, which had been in operation over three years. Samuel Headley & Co., and Wadsworth, Allyn & Bostwick, in counter petitions against the free importation of iron wire, stated that since 1st August, 1811, they had erected in Simsbury and Winchester, Ct., two manufactories, where, without previous knowledge, they had succeeded in making from native ore the various kinds of iron wire, of the best quality, and at moderate price. 1812

On the 3d March a resolution of the Legislature of Massachusetts was submitted to the Senate of the United States, offering to contract with the government to supply all the blankets and clothing it might need in

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(1) The white lead made at the extensive manufactory of the patentee, established several years before in Philadelphia, was at that time considered by painters equal to the imported. Red lead was made by several, and to the amount of over $13,000 annually, by three small factories in Pittsburg. Paints of over twenty-two different colors, of bright and durable quality, were made in Philadelphia. One of these, the brilliant Chromate of lead (chromic yellow), was first made in this country, a few years before, by Mr. Godon, who supplied several cabinets with samples, and the process was perfected by Mr. Hembel, of Philadelphia, who published an account of his methods in Cooper's Emporium of Arts and Sciences, in June 1814 (N. S. vol. 3, 305). The material, chromic iron, was found abundantly near the city, in Chester county, embedded in steatite, or soap rock, lying above the primitive limestone, and in similar position at the Bare Hills, near Baltimore, where it was used as a material for turnpikes. The manufacture, on a commercial scale, was first undertaken by Mr. George Chilton, who was followed by Clinton and Jarvis, of New York, in 1812, and by others. It first sold for $3 per pound. All the mineral acids and chemical drugs were made by several in Philadelphia at this date.

any contingency, and representing that commonwealth as able to supply such articles, principally from its own manufactures.

An act of Congress authorized (March 12) the enrolling and licensing of steamboats, employed on the bays and rivers of the United States, and owned wholly or in part by resident aliens.

An act laying a temporary embargo on all ships and vessels in the ports and harbors of the United States, for ninety days, was, by recommendation of the President, passed and approved April 4. It was followed, on the 14th, by an act prohibiting the exportation during the same period, of any specie, or any goods, wares, or merchandise, under penalty of forfeiture and a fine of ten thousand dollars.

A declaration of war against Great Britain, of which the foregoing acts were the precursors, was made by Congress, and approved 18th June, and proclaimed on the following day. On the 5th of the same month, and before a knowledge of this act had reached England, the British orders in council were repealed.

The commencement of hostilities called for appropriate fiscal measures to sustain it, and after authorizing the issue of five millions of dollars in treasury notes, a law was approved on the 1st July; adding one hundred per centum to the permanent duties then levied upon imports, with an additional ten per centum on goods imported in foreign vessels, and $1.50 per ton additional on vessels owned wholly or in part by foreigners. This act, which passed by a vote of seventy-eight to forty-six, was to continue in force until the expiration of one year after the conclusion of peace, but was continued until June, 1816.

Through the combined effects of double duties, the obstruction and spoliation of commerce, the prices of nearly all articles of prime necessity immediately advanced. Between the 9th June and 13th July, hyson tea rose from 96 cents to $1.35 per lb.; white Havana sugar from $14.75 to $18.50 per cwt.; Russia hemp advanced from $242.50 per ton, on 9th June, to $300 on 10th August; and salt, between 1st May and 1st August, from 55 to 85 cents per bushel, and continued to rise to $3 per bushel in October 1814. Tin advanced from $25 per bar, on 1st May, to $32 on 1st August, and rose to $50 in 1814. Merino wool rose in price, between May and October, from 75 cents to $1.50 per pound, and at the end of 1814 sold from $3 to $4 per pound. Cloth advanced from $8 per yard in May 1812, to $14 in May 1814, and during the war to $18 a yard.

Under the stimulus of high prices and a steady demand, capital and enterprise were again turned more powerfully than ever to the increase of manufactures, especially to those branches which were immediately subservient to the war, or of which the want was most pressing. The woolen and cotton manufactures in particular received a remarkable extension. Many joint stock companies were formed, and in common with those which had been established a few years past, enjoyed, so long as the war operated as a protection, an ample remuneration for their expenditures, notwithstanding a rise of twenty to fifty per cent. in the wages of operatives, two to three hundred per cent. in mill seats, and of many raw materials in the same proportion. Great losses were incurred in many instances through the incapacity and sometimes the dishonesty of mechanists and operatives.

The annual value of domestic exports of the United States, calculated on an average of ten years, ending 30th September, amounted to $37,454,583, and of foreign merchandise re-exported $30,563,563. The average annual value of domestic manufactures exported in the same period was $2,096,000, or 5.51 per centum of all domestic exports. The produce of agriculture exported in the same time was $27,875,026, or 73.36 per cent. of the whole; of the sea $2,124,242 or 5.59 per cent., and of the present $4,404,946, or 11.59 per cent. The total value of exports this year was $38,527,236.

The average annual value of domestic produce exported to Great Britain and her dominions in the last ten years was $16,853,102, or 44.99 per centum of the whole, and the value so exported to France and her dominions was $3,118,217, or 8.32 per cent. of the whole. The total value of all articles of domestic and foreign origin exported to the two countries in the same period were respectively 27.44 and 18.9 per cent. of the whole value of exports.

The advantages and profits of this vastly more important trade with Great Britain, was now placed in jeopardy by a war waged upon pretexts, which would have been equally valid against France, and in support of claims which were finally abandoned, so soon as Napoleon, whose intrigues had involved the two countries in hostilities, had been humbled by Great Britain. The war was in consequence extremely unpopular with a large and influential class, who believed the difficulties might have been adjusted without a resort to arms.

At the fair and cattle show of the Berkshire Agricultural Society, held at Pittsfield, Mass., the prize of $50 was awarded to the president, Elkanah Watson, Esq., for the best piece of broadcloth exhibited. It was believed to be superior in all respects to any cloth ever made in America, and probably any ever imported. One-half the piece was left for inspection at the warehouse for American goods in Albany. The first cloth mill of any size in Berkshire was this year erected by Mr. L. Pomeroy, at Pittsfield, which was itself small, for several years employing but one set of machines, and five or six hand looms, and consuming about 1,200 lbs. of wool in the manufacture of broadcloth. The first power loom was not introduced there until 1825 or 1826.

The largest manufactory of fine cloths and cassimeres in operation in New England, if not in the country, at this date, was that of the Middletown Woolen Manufacturing Company—Isaac Sanford and others—in Connecticut. It was wholly employed on fine Spanish wool, which yielded the best profits and the steadiest sales. It made daily from thirty to forty yards of broadcloth, which sold at nine and ten dollars a yard by the piece. The mill employed one of Evans's steam engines, of twenty-four horse power, which drove all the machinery for carding, spinning, reeling, weaving, washing, fulling, dyeing, and finishing with the aid of a brushing machine, as well as for warming the building, etc.[1] The dyeing department was under the management of a Mr. Partridge, previously of Philadelphia, a superior dyer from the west of England. The cloths were finished without the disagreeable gloss, until recently, nearly universal with English cloths, which were finished by hot pressing. Superfine cloths, made from the first imported merino wool, and thought to compare favorably with any imported, were exposed for sale at the warehouse of the Domestic Society in Philadelphia. The product of the factory was about to be doubled. It was no longer found difficult to obtain good workmen in every branch, from among their own apprentices or other Americans. Gig-mills, for teasling and napping cloth, were erected to some extent in New England and New York, and were driven by steam or water; but hand cards were still used exclusively in Pennsylvania. Some sixteen or eighteen patents had been granted in the country for shearing cloth by steam or water power, several of which were in use. Hand shears had also been operated by water power. Blankets were at this time made in considerable quantity in that state, as well as in Massachusetts. The manufacture of blankets was greatly expedited by a machine invented and patented in April of this year, by Elkanah Cobb, a native of Vermont, belonging to the United States army, which enabled a single workman to make twelve blankets in a day.

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(1) Oliver Evans, the first steam engine builder in the United States, had in operation, in February of this year, ten of his high pressure engines, considered by many more economical and convenient for manufactories than Bolton & Watts. They were from ten to twenty-five horse power, and were employed, one in Florida, two in Louisiana, one at Lexington, Ky., one at Natchez, Miss., one at Marietta, Ohio, two at Pittsburg, one at Middletown, Ct., and one at the Mars Iron Works of the builder, in Philadelphia. They performed the various operations of sawing timber, grinding grain, drawing wire, grinding glass, turning wood and metals, etc., manufacturing cloth, and building steam engines and machinery. Ten others, most of them of greater powers, were building, or ordered, for saw and grain mills, paper mills, rolling mills, steamboats, etc. Stackhouse & Rogers built engines at Pittsburg, under Evans's patent.

Numerous small factories for coarse woolen cloths were going into operation in New England, and generally throughout all the northern sections of the Union; unusual activity and preparation was apparent in the woolen branch. The first steam engine in Providence, R. I., one of thirty horse power, built by Evans, was also put in operation this year in the mill of the "Providence Woolen Manufacturing Company," consisting of S. G. Arnold, S. Dorr, J. S. Martin, and David Lyman, whose factory occupied the present site of P. Allen & Co.'s Print Works. The new woolen mill of E. I. Dupont & Co., near Wilmington, Del., was said to be making woolens to the value of between $150,000 and $200,000 annually. The quantity of wool sheared in the United States, estimated, from the imperfect returns in 1810, at thirteen to fourteen millions of lbs., was this year computed by Mr. Coxe to be twenty to twenty-two millions, and by some still higher. The proportion of fine wool was rapidly increasing, and no country probably ever witnessed so rapid a change in the extent and quality of its flocks, as a few years effected in the United States.

As on former occasions when the United States had felt compelled to refuse the manufactures of the principal producing nation of Europe, and to draw upon its own resources for supplies, the efforts of the cotton and woolen manufacturers were aided by a general disposition of the people of all classes to dress in homespun fabrics; and the chief magistrate is said to have set the example of wearing cloth made exclusively of domestic wool in New England factories.

The cotton manufactures of Rhode Island and adjoining states, in common with the woolen branch also, received at this time its great impulse as a result of the war. The village of Pawtucket already contained twenty-four cotton factories, and upward of twenty thousand spindles. An instance of the commendable regard for the moral interests of the operatives, and their consequent efficiency, first introduced by Mr. Slater, and at this time conspicuously exhibited by the Humphreysville Woolen Company, in Connecticut, was also shown this year by the Messrs. Wilkinson and others, proprietors of the Pomfret Cotton Factory, in the erection of a convenient brick edifice, as a school-house and place of worship for the employees and their families.

Public attention was about this time first called by Mr. Charles Whitlow, a nurseryman and florist, of New York, to a native filiaceous plant, believed to be an undescribed species of nettle, and therefore named, in his honor, *Urtica Whitlowi*, the fibres of which were thought to be superior to either flax or hemp as a material for manufacture. The plant, a hardy perennial, found in the low grounds of Orange co., N. Y., and Sussex co., N. J., where it had been for some time occasionally used in making thread, was described in the Baltimore Medical and Philosophical Lyceum (vol. 1, No. 4). Mr. Whitlow, who claimed to have first discovered its useful properties, proposed, in a petition to Congress in December 1811, to disclose to it the important discovery, in consideration of being allowed to import by special license all such seeds, grains, and plants as he might desire. A special committee was appointed to consider it, but was discharged without reporting. The subject was also before the New York Legislature, and experiments were instituted by the Mayor and corporation of New York. In January of this year Mr. Whitlow was granted a patent by the United States, and sold the privilege of using it to the Agricultural Society of South Carolina for $300. Similar offers were made to the trustees of the Massachusetts Society for Promoting Agriculture, and probably others. A company was the next year incorporated in New York, to manufacture the fibre, which had been previously spun into six hank yarn, valued at $11 a pound, with a yield of fifty per cent. An acre was estimated to produce 1,000 lbs. (in its native soil), and 500 lbs. of dressed fibre suitable for six hank yarn. A certificate from several manufacturers of flax, hemp, and cotton, represented it as superior in quality and productiveness to any flax or hemp they had ever seen. A tract of meadow twenty miles wide, throughout the western counties of New York, known as the "Holland Purchase," abounded in this species of Urtica, which had also been found in Maine. It has never yet superseded the annuals hemp and flax, but attention has been again directed to it recently, as worthy of cultivation, for properties which it possesses in common with other species of nettle, hops, etc.[1]

Francis Guy, of Baltimore, introduced this year a new kind of carpet, made of common paper hangings, which, it was thought, would prove as durable as canvas floor cloth, and be much more beautiful, and fifty per cent. cheaper. It was patented in 1819, but a specification of the

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(1) As early as 1760 the Society of Arts in London offered a premium for cloth made from hop stalks or bines, which was attempted the next year by a Mr. Cooksey. In 1785 the Society renewed the offer of a gold medal or twenty pounds for such cloth, which was then made in Sweden. In 1803 the Society of Economy at Haarlaem offered prizes for the best memoir on the use of nettles for cloth, etc., and in 1809 Mr. Edward Smith, of Brentwood, in Essex, made two communications to the London Society on the use of the stinging nettle (U. Dioicous), for such purposes, having given his attention to it since 1793. He was the next year awarded by the Society a silver medal for specimens of yarn, paper, etc., from the nettle, and in 1811, having much extended his experiments, was awarded the silver Isis medal of the Society for samples of cloth and cordage made from the same plant. The same society, in 1816, voted Mr. Whitlow its silver medal for a method of preserving potatoes for sea stores or for transportation, by packing them in barrels with dry sand.—*Transactions Soc. Arts*, vols. 3, pp. 68, 141; 28, p. 109; 29, p. 81; 33, p. 196.

invention was filed as early as 1806, since which time he had been engaged in perfecting and testing the value of the article. It was intended principally for summer use.

A communication addressed by Mr. Coxe to the Secretary of the Treasury, on 8th December 1812, and printed with the digest, contained some interesting facts and statements based upon the census and other official returns and documents. These sources of information enabled him to state with confidence that American manufacturers in their demand for raw material had greatly surpassed the abilities of the planter, farmer, landholder, and miner, to supply wool, flax, hemp, hides, and skins of domestic animals, and the various metals, and the same was true of the crude sugars and molasses of Louisiana, considered as a raw material for refiners and distillers. From forty to fifty millions of pounds of the first five articles had for several years been annually imported from abroad as raw materials. Hemp to a considerable amount was regularly imported, notwithstanding an extraordinary duty upon it, and the great and sudden increase in the growth and manufacture of cotton. It was "an impressive fact that manufactures in America outrun agriculture in most instances;" cotton was the only redundant material. The number of American articles on the regular lists of exports from the United States, was about one hundred and ten, of which about seventy were manufactures of the country.

Gold and silver wares were made sufficient for every demand, and the present workmen could make for foreign sales a quantity equal to that exported by any nation of Europe. The manufacture of gold and silver leaf had been recently introduced, and flourished particularly in New York. Rollers and other machinery were used in that, and the button and other manufactures of the finer metals.

The most weighty fact respecting the iron manufactures was, that instead of exporting iron as they had formerly done, they could not obtain enough of pig metal and brass to satisfy the great and increasing demand of labor-saving mills and machines, and of the numerous handicraft workmen. They had raised the price of bar iron, since the Revolution, from sixty to one hundred and ten dollars the ton. The manufacture of common steel, iron wire, and edged tools, had greatly advanced since 1810. Edged tools were then made from rolled steel by a recent improved process. But greater attention was desirable to fine manufactures, such as cutlery, fine tools, watch springs, etc. Pharmaceutical preparations were made to the number of seventy. The recent employment of children and females in manufacturing operations, the improved means of communication and correspondence, the extension of sound bank facilities to manufactures, the introduction of new and exotic raw materials, of laborers, artizans, and manufacturers, and of new processes in every branch, were among the evidences of progress.

The first Artificial Globes manufactured in the United States were made about this time at Bradford, Orange co., Vt., by James Wilson.

At Strafford, in the same county, 8000 lbs. of copperas were made in 1810 by the Vermont Mineral Factory Company, which early in this year petitioned Congress for a duty on the foreign article, under the belief that they could supply the whole Union, from inexhaustible beds of pyritius iron, in that town and Shrewsbury. The manufacture of copperas was also commenced this year on the Mogothy river, in Maryland, by Richard Colton, Esq., and others. About three years after, the manufacture of alum was added at this place, by a Society incorporated in 1818, with whom was associated the eminent mineralogist and crystallographer, Dr. Girard Troost, who about this time superintended the chemical laboratory of Mr. Wetherell, and was a principal agent in founding the Acadamy of Natural Sciences in Philadelphia. Copperas was also made during the war at Pequannock, Morris co., N. J., from the sulphurets of Copperas Mountain. But the principal domestic supply, for the states east of the Alleghanies, was for many years derived from the Vermont Works, which have since produced as much as one thousand tons a year of copperas, preferred by the dyers to any other.

The manufacture of Emery, an article of much value in cotton, woolen, glass, steel, and lapidary works, was also commenced at this time, when about to become scarce and dear. It was first attempted by Pliny Earle & Brothers, card makers, of Leicester, Mass. The business was also about to be commenced by Gilbert J. Hunt, of New York. The material, corundum, and similar minerals, was thought to be abundant in granite and other primitive rocks, particularly near Haddam, Ct., Chestnut Hill, Pa., Baltimore, Md., and Lake George, N. Y.

In consequence of the scarcity of Pins, which this year rose in price to one dollar per paper by the package, the manufacture of them was commenced by some English pin-makers, who brought the necessary implements, and established themselves at the State Prison, in Greenwich, N. Y., under the management of a person named Haynes. He occupied a part of the Almshouse, at Belleville, and contracted for pauper labor; but the business was abandoned on the return of peace. It was resumed about 1820, with the use of the same tools, by Richard Furman, who carried it on at considerable loss for a year or two, when he died, and the manufacture was given up.

The first Flint Glass works on a large scale were this year established at Pittsburg. Preparations were also made for the same business at

Boston, where a large factory went into operation about four years later. Mr. Carnes, who is still engaged in the business in South Boston, commenced the manufacture this year.

A domestic supply of "Burr" millstones, for the western country, was found in an extensive quarry of cellular and amorphous quartz, opened near the head of Raccoon creek, Athens co., Ohio. It was considered identical in composition with the French curb stone.[1] The first pair were put in the steam flour mill of the Marietta Mill Company, started in January by Messrs. Gilman, Barber, Skinner, Fearing & Putnam, who afterward added woolen machinery. Large steam saw and flour mills were also erected this year at Cincinnati and Louisville. The first iron castings were made at the latter place this year by Paul Skidmore, whose successors, Prentiss & Bakewell, in 1816, added the manufacture of steam engines for steamboats and factories.

[Louisiana was this year admitted into the Union. It produced 10,000,000 lbs. of sugar, and 20,000 bales of cotton were shipped from New Orleans.]

The scarcity of Virginia coal, which up to this time had been the principal source of domestic supply, led to renewed experiments with the Pennsylvania anthracite, which had lately been analyzed, and was employed in the rolling mill of Mr. Joshua Malin, near Philadelphia, as well as in some private houses. The first anthracite from Pottsville reached the city this year, from the Centreville mines, and was sold for the cost of transportation. The first coal stove in the borough of Reading was introduced by Wm. Stahle, stone coal having been brought to that place about the same time by Marks John Biddle. The availability of anthracite for manufacturing purposes was more fully established about this time by Messrs. White & Hazard, wire drawers, at the Falls of Schuylkill. A memorial which they and others presented to the Legislature to obtain a law for the improvement of the Schuylkill river, and urging, among the inducements, the coal deposits at its head waters, is said to have drawn from the senator from Schuylkill county a declaration that there was no coal there, only a "black stone" called coal, which would not burn.[2] So little was then known of this vast mineral resource and manufacturing agent.

The now flourishing city of Rochester, N. Y., dates its existence from

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(1) Burr millstones had been made of Georgia stone, in Philadelphia, by Oliver Evans for some years. There was also, in 1810, a manufactory in Baltimore. The Esopus millstones of New York were also in use.

(2) During the year 1860, seventy-eight operators, owning one hundred and thirteen collieries, mined 3,276,879 tons in Schuylkill county.

this year, in which it was first laid out, and the first framed house, bridge, merchant's store, and post-office, were set up in it, and a mill lot on west side of the Genesee, purchased ten years before by Nathaniel Rochester, was first occupied. The village had no place in the State Directory, published the next year, and was not incorporated as such until 1817.

The minds and the pens of many mechanicians and men of science were considerably exercised about this time by the pretended solution of the great problem of perpetual motion. A man in Pennsylvania named Redheffer, exhibited in different parts of the Union an ingenious contrivance, which, by a system of weights and wheels, and ostensibly self-winding, appeared, to the unwary, really to perpetuate its own motion, and brought the inventor a rich harvest at one dollar a head. The momentum was, however, derived from another source, and the art lay in effectually concealing its origin from the incredulous, while the multitude were put on the wrong pursuit by the visible mechanism. The celebrated Jacob Perkins, at this time engaged in constructing machinery for boring cannon and other improvements in artillery, and in pyrotechny, etc., at once detected the inadequacy of the visible mechanism, and ordered a saw passed through a certain part which is supposed to have concealed a secret cord. But the exhibitor refused the test. Robert Fulton also consented to visit the machine in New York, and by his ear soon discovered the agency of a crank, by the unequal motion produced. He charged the showman with imposture, and proceeded to demonstrate it by demolishing a portion of the wall of the room, through which a catgut string, leading from the machine, was traced to a remote cock-loft, where an aged man sat unconsciously turning a crank. The deluded crowd demolished the apparatus, and the proprietor soon disappeared.

In the early part of this year Col. John Stevens, of Hoboken, N. J., published a memoir entitled "Documents tending to prove the Superior Advantages of Railways and Steam Carriages over Canal Navigation." The use of a steam carriage to transport one hundred tons of produce from Lake Erie to Albany, a distance of one hundred miles, at a cost of fifty cents per ton (the expense by canal being estimated at $3 per ton), was described in the pamphlet seventeen years before Mr. Stephenson built the first effective locomotive in England. The advantages of railways had been previously urged by Stevens, upon both the canal commissioners of New York, and the United States government.

The first cotton mill at Fall River, Mass., then called Troy, was this year erected by a company incorporated by the name of the Fall River Company. The Troy Manufacturing Company was also chartered, and proceeded to erect another factory at the same place. A third factory was built there in 1821, and two more the following year. The James River Cotton Manufacturing Company, at Kingston, was incorporated.

The "Waltham Cotton and Woolen Manufacturing Company," with a capital of $450,000, was also incorporated. This, and the "Boston Manufacturing Company," chartered the next year, with large factories on the Charles river, at Waltham, were among the most extensive and prosperous in the country at the close of the war, and for many years after. The Monson Woolen Manufacturing Company, in Hampden county, was also incorporated.

The unexampled increase of cotton and woolen factories, and the consequent demand for cards,[1] led to the establishment of the New York Manufacturing Company, incorporated in June of this year, with a capital of $800,000, of which $300,000 was to be employed in manufacturing cotton and wool cards and erecting the necessary buildings, and the remainder in banking. The patent right and machinery of the Messrs. Whittemore was purchased on 20th July, for $120,000, and buildings were commenced with formal ceremonies, on New York Island. The new impulse given to manufactures by the war, gave the company active and profitable employment, until the large importations, which followed the peace, compelled the factories to stop, and with them the demand for cards. In 1818 the entire manufacturing property was sold to Messrs. S. & T. Whittemore, brother and son of the inventor, the former of whom carried it on many years, while the original company, with increased capital, assumed the name of the "Phoenix Bank," which still survives. On the expiration of the patent, in 1825, the machinery, built in part by the inventor, returned, after an absence of twenty-five years, to the possession of his son in West Cambridge, where the elder Whitney died, in 1828, and where the business is still conducted by the family.

The following companies and associations were also incorporated in New York the present year, under the general act:—The Steuben Woolen, the Nassau, the Verbank, the Walloomsock, the Farmers and Mechanics, and the Broadalbin Woolen Manufacturing, the Troy Wool and Cotton Factory,[2] and the Orange Factory. Special charters were

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(1) The celebrated William Cobbett, in his Essay on the Regency, stated that he had been credibly informed that the value of cotton and wool cards shipped from Liverpool to America, in 1810, to supply the new manufactures created by the embargo and non-intercourse acts, exceeded the annual value of cloths exported thence from the counties of Somerset and Gloucester.

(2) The village of Troy already possessed considerable manufacturing industry, attracted by its fine water power. It contained a rolling mill, fire-arms manufactory, spade and shovel factory, several nail works, a large cotton and woolen factory (above mentioned), carding machine, fulling mill, paper mill, a large ropewalk, a distillery, several grain and saw mills, etc., and two banks.—*Spafford's Gazetteer.*

granted to the Butternuts Woolen and Cotton Factory, the New York Marble, the United States Lead Mining and Manufacturing, the Dutchess County Slate, the Clason Woolen, the Onondoga Manufacturing, and the Cambridge Farmers' Woolen, Companies and Associations.

Two hundred and thirty-seven patents were issued this year, a considerable number of which were for apparatus for spinning, weaving, and other processes in the manufacture of wool, cotton, flax, and hemp. Upward of a dozen were for spinning machinery, among which was a portable or family spinning machine, of very simple construction, invented and patented (April 27) by Rev. Burgiss Allison, of Philadelphia.[1] It drove ten to fifteen spindles, and occupied very little more space than the common spinning wheel. It spun wool to any fineness required, and could be used for cotton if previously carded into rolls. Improvements in the loom also engaged much attention, at this time, on account of the great impulse given to manufactures in England by the power loom, the construction of which was still a secret, and its exportation, as well as of all models, drawings, etc., forbidden. Among those who labored to produce a power-loom were Judge Daniel Lyman, of Providence, and Mr. F. C. Lowell, of Mass. Mr. Lowell had just returned from a residence in Europe, where he had conceived the idea of an extensive prosecution of the cotton manufacture in the United States, such as he had witnessed abroad, with all the recent appliances, including the power loom. Having, in connection with his brother-in-law, Mr. Patrick T. Jackson, set himself to the invention of such an engine, he produced, in the autumn of this year, after many failures and experiments, a working model of a power loom. They secured the services of an able mechanician, Mr. Paul

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(1) Portable spinning jennies and billies of six to twenty-four spindles, for family use, were at this time in quite extensive use, particularly in country parts remote from the larger factories, and in the Southern States. Billies carrying twelve spindles, to spin fourteen cuts to the pound, or by spinning a second time, twenty cuts, were made and sold in Philadelphia for $48 each, by Joseph Bamford, 5 Filbert st., who also manufactured machinery for large establishments. Nearly every second farm house had also its hand-loom. We learn from letters written this year by Mr. Jefferson to Genl. Kosciusko, and to Mr. Melish, whose "Travels" showed the same system of household industry to pervade the Western States, that he employed a carding machine costing $60, and worked by a girl twelve years old, a spinning machine, for wool, of six spindles, which cost $10, another spinning machine of twelve spindles, costing about $25, for cotton, and a loom with flying shuttle, weaving its twenty yards a day. This machinery, which cost him $150, worked by two women and two girls, was more than sufficient to make the necessary coarse fabrics for his farms, some 2000 yards annually. Many private families did much more than he in that way, and he soon after doubled the number of his spindles. The British Parliament this year rewarded with grants of five thousand pounds each, Mr. Samuel Crompton, the inventor of the mule spinner, and Mr. Wright, the inventor of the double mule. The spindles in Great Britain at this time were between four and five millions.

Moody, of Amesbury, to build the machine (which they patented in 1815), and with the first efficient American power loom proceeded to carry out their project, at Waltham, where they erected a cotton mill the ensuing year.

Some eight or ten patents were issued this year for looms of various kinds, including one to John Thorp, of Providence (March 28), for a hand and power loom; to Cyrus Shepherd, Philadelphia (April 27), for a water loom; and one to J. and Rozanna Sizer, New London, Ct. (Oct. 21), for a loom for weaving feathered cloth. Patents were also granted to Enoch Leonard, of Canton, Mass. (Jan. 6), for making steel from pig-iron; two to Morris B. Belknap, Greenfield, Mass. (Jan. 16 and June 13), for a machine for cutting files and sickles, which cut from five to six dozen twelve inch files daily; also to Charles Hesser and Amos Paxson, of Philadelphia (April 11), and to William T. James, of Greenwich, Washington co., N. Y. (Nov. 19), for file cutting. The latter was put in operation at Union village, where an ingenious manufactory of files and of cast steel existed at this time. Files were also extensively made in Philadelphia. Charles Whitlow, New York (Jan. 11), for a plant applicable to various uses; Uri K. Hill, New York (Feb. 7), types for music; Daniel Waldron, New York (March 4), manufacturing fish glue (icthyocolla); Mellen Battle, Herkimer, N. Y. (March 27), a rotary steam engine; William Dunn, Boston (April 1), preparing magnesia; Elkanah Cobb, Georgetown, D. C. (April 29), making blankets; Robert U. Richards, Norfolk, Ct. (May 23), manufacturing boots and shoes with wooden pegs, screws, etc.; E. Hazzard and Joseph White, Philadelphia (May 25), cutting screws; James Howell, Philadelphia (June 11), rolling wire; also to J. T. & Thomas Walden, New York (Oct. 6), and to John J. Staples, Flushing, N. Y. (Oct. 31), for drawing wire; E. Gordon, Philadelphia (June 26), a rolling press for edge tools; Richard Marden, New York (Aug. 21), manufacturing oil of vitriol; William Edwards, Northampton, Mass., three patents, viz. (Oct. 19), one for tanning, and one for the roller for preparing leather, and (Dec. 30) one for tanning sole leather. These were all capital improvements of Mr. Edwards. The rolling machine, particularly, is still in use in nearly its original form, and gives to leather the finishing process, by which it acquires that smoothness of surface and solidity of texture peculiar to hammered leather.

1813 Congress authorized, January 2d, four ships of war, of seventy-four guns each, six of forty-four guns, and six sloops of war, to be built, equipped, and commissioned, and as many sloops or armed vessels as the public service might require on the lakes, to be procured, equipped, and commissioned. An appropriation of $100,000 was made for the erection of a public dockyard for the repair of public vessels. The President was also empowered, July 5th, to cause to be built as many barges, not less than forty-seven feet long, capable of carrying heavy guns, as the service might require.

A second series of the "Emporium of Arts and Sciences," commenced in May of the last year, under the conduct of Dr. John Redman Coxe, Professor of Chemistry in the University of Pennsylvania, was begun, in February, to be managed by Dr. Thomas Cooper, Professor of Chemistry, Natural Philosophy, and Mineralogy, in Dickinson College, Pennsylvania. It was devoted to the publication of practical papers on manufactures and the arts from the more scarce and voluminous among foreign publications, and of original essays, many of them by the editor. It was the means of diffusing much scientific and practical information, particularly in relation to the chemical and metallurgic arts, at a time when it was needed to enable American manufactures to participate in the progress of science, then becoming a powerful auxiliary to practical knowledge in other countries. The prospectus of Professor Cooper advanced a number of strong arguments in favor of the encouragement of manufactures, as a means of supplying a home market for agriculture, and of lessening the dependence upon, and indebtedness to foreign manufactures. Protecting duties, to aid their introduction, and afford a reasonable safety to capital and industry, he regarded as expedient, a position which he appears afterward to have abandoned, when, as President of Columbia College, South Carolina, he became one of the ablest champions of a free trade system.

The Archives of Useful Knowledge, edited by Dr. James Mease, of Philadelphia, which completed its third volume this year, also performed a useful service as an instructor in science and the practical arts.

There were at this date, as appears by petitions and communications addressed to Congress by Joseph Revere, of Boston, and Levi Hollingsworth, of Maryland, asking for a duty on copper imported in sheets and bolts, three manufactories of sheet copper, bolts, rods, spikes, etc.; those of the Messrs. Revere, which made about three tons per week, the Gunpowder Copper Works of Mr. Hollingsworth, ten miles from Baltimore, and that of Mr. Livingston, in New York. The last two were capable of making each about 100 tons per annum. They could each double the amount of their product if it were warranted. The quantity of crude copper annually imported was about four hundred tons, chiefly from the western coast of South America, Buenos Ayres, Caraccas, Mexico, and the Levant.

An act was passed, February 25, imposing a duty on iron wire imported equal to that on iron, steel, or brass, and other manufactures of iron.

Mr. Tench Coxe completed, May 1, by order of the Secretary of the Treasury, and conformably to a resolution of Congress, a digest of the census returns on the subject of manufactures in 1810. A careful estimate of all the facts within his knowledge, convinced him that, notwithstanding an interrupted importation of certain raw materials, the several branches of manufactures had advanced, since the autumn of 1810, at the full rate of twenty per cent. The whole population, taken at 8,000,000 of persons, he estimated would produce in the current year an aggregate value of manufactures, exclusive of doubtful articles, of $200,000,000, or £45,000,000 sterling. The State of New York had partaken most largely in the increase, especially by her joint stock companies, and by reason of emigration from the Eastern States. The general result furnished a gratifying comparison with the product of English manufactures, which, in 1787, when the population of England alone was about the same as that of the United States at this time, or 8,500,000, were computed at $266,000,000. This state of manufactures had been in a great measure attained by the United States in the thirty years since the completion of its independence, and with only an incidental support from government, while England had been hundreds of years progressing under many forms of governmental aid.

A sample of sugar, made from the butternut or white walnut tree, by Jonathan Pearson and Moses P. Gray, of Epsom, N. H., was presented to the Massachusetts Agricultural Society. The yield was at the rate of one and a quarter pounds from nine quarts of sap, or greater than that of the sugar maple. The trustees recommended a critical test of the sugar-producing qualities of the white walnut, sugar having become scarce and dear.

Congress imposed, July 24, the following internal duties to be paid during the war, and until the expiration of one year thereafter, viz: on all public and private carriages, annual rates varying from two to twenty dollars each, on all sugars refined in the United States, four cents a pound, with the privilege of drawbacks on exportation to the amount of $12; on sales at auction, one per cent., except on sales of ships or vessels, which was one quarter of one per cent.; on stills or other implements employed in distilling domestic materials, a change from nine cents per gallon on the capacity of the still, for every two weeks, to one hundred and eight cents a year—half these rates when employed in distilling roots; upon stills employed on foreign materials, the rate was from twenty-five cents per month to one hundred and thirty-five cents per annum for each gallon of the capacity. In all cases in which steam was employed, the rates were double. Duties were also laid, August 2, on all bank and promissory notes, bills of exchange, etc.

An impost duty of twenty cents on the bushel of fifty-six lbs. was laid, July 27, on all foreign salt imported during the same period, and a bounty of twenty cents a barrel on pickled fish exported, together with an allowance of $2.40 to $4 per ton, according to size, to vessels engaged in the bank or cod fisheries. This act was continued indefinitely in 1816, and while in force greatly promoted the manufacture of salt, which, since the duty was taken off, in 1807, had sold in New York from fifty cents to one dollar a bushel for Turks island. The manufacture was much extended in Massachusetts, which state, after the repeal of the former duty, had exempted its salt works from taxation. The increased price of salt, occasioned by the war, and the inability to obtain it from the New York salines, led this year to the first manufacture of salt on the Conemaugh and Kiskiminetas, in Western Pennsylvania. Mr. William Johnston succeeded in penetrating the solid rock, on the bank of the Conemaugh, near the mouth of the Loyalhanna, where numerous salt springs indicated a supply, and at the depth of four hundred and fifty feet, struck an abundant fountain. Having erected furnaces, pans, and other apparatus, he was soon able to make about thirty bushels daily, which sold at a high price, and induced many others to engage in the business. The pumps were at first worked by horse power, and afterward by small steam engines. The salt works of Onondaga, N. Y., in 1810, consisted of 125 blocks, with 1,010 kettles, and produced 435,840 bushels of salt. The state was this year estimated to yield 700,000 bushels. Salina village contained eighty salt works or houses, and Liverpool, three miles below, thirty-five salt works, in addition to the middle works, and some detached ones.

Pittsburg, in addition to large quantities of ironmongery and coarse hardware, japanned and tinwares, white metal buttons, etc., made for the western country, contained at this time five glass factories in the town, producing flint and green glass to the amount of $160,000; two large iron foundries (McClurg's & Beelen's), which cast about six hundred tons a year, worth $54,000, and a small one for casting butt-hinges, carried on by Mr. Price; an extensive edge tool and cutlery manufactory, by Brown, Barker & Butler; a steam manufactory of shovels, spades, scythes, etc., by Foster & Murray; one rolling mill, by C. Cowan, erected this year, with a capital of $100,000; a lock and coffee mill factory, commenced the last year by James Patterson, an Englishman; a factory for files and door handles, etc., by Updegraff; two steam engine works, Stockhouse's and Rogers & Tustin's; one steel furnace, by Tuper & McKowan; a wool carding machine factory, by James Cummins; one woolen factory, by James

Arthurs; one flannel and blanket factory, by George Cochrane; one cloth steam machine factory, by Isaac Wickersham; two manufactories of stirrup irons and bridle bits; one wheel iron factory, by Stevenson & Youard; one wire mill, by Eichbaum & Sons; one button factory, by Reuben Neal; one knitting needle factory, by Frithy & Pratt; two silver platers, B. Kindrichs and Mr. Ayers; a morocco factory, by Scully & Graham; one white lead factory, by Beelen; a suspender factory, by Wm. Gore; one brass foundry; three coopers; a trunk factory, by I. M. Stevens; a brush factory, Blair's; six saddle factories; two breweries; a steam flax mill; a ropewalk, by John Irwin & Co.; eleven copper factories; and three plane factories. The curriers' knives, made in Philadelphia, were declared by the curriers to be equal to the best imported.

The first Stereotyping in America was done this year in New York, by D. & G. Bruce, at their foundry, William street, near Exchange Place, and also by John Watts, who issued the Assembly of Divines' Catechism, believed to have been the first issue of the American press from stereotype plates. The Messrs. Bruce, in 1815, stereotyped the first Bible in America.

A manufactory of blacklead Pencils, of excellent quality, was in operation at Granville, Washington co., N. Y. The manufacture was commenced in New York city, within four or five years after, at which date graphite, or Plumbago, was stated, by Professor Cleveland, to exist in Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and North Carolina. The mountains of Essex and Clinton co., N. Y., were known to have nearly inexhaustible quantities, and Ticonderoga now makes many tons of black lead yearly.

Essex county at this time had fifteen bloomeries for making bar iron, besides several anchor shops, trip hammers, etc. Extensive iron works and a woolen factory were this year erected on the Au Sable, at Keeseville, four miles west of Lake Champlain, by Richard and Oliver Keese and John W. Anderson. These and neighboring works in the Adirondac region, have produced iron of a superior quality, much of which has been made into nails, horse-shoes, edge-tools, machinery, and merchant iron direct from the ore. Ticonderoga at this time contained a broom manufactory, carried by water, by which one man made one hundred brooms daily.

The town of Scipio, Cayuga county, produced about 2,500 skeins of sewing silk. The white mulberry was introduced there, by Samuel Chidsey, at its first settlement. During the war, about this time, he sold sewing silk to the amount of $600 in a year.

The charter of the East India Company having expired, the trade with

British India was thrown open to the public under certain restrictions. The cultivation of cotton in that country, for exportation, had for many years been encouraged by the British public. In view of a rupture with the United States, in 1809, these efforts were renewed by the Society of Arts and other agencies, with such energy as to produce an exportation of thirty millions of pounds to England, but were again relaxed on the resumption of commerce with the United States. During the present year, American cleaning machines were introduced at Tinnivally, in the Carnotic, where a Mr. Hughes had succeeded in producing Bourbon cotton, with more success than in Bengal. Experimental farms, established five years after by the government of Madras, demonstrated the possibility of raising cotton of fair quality on the Coromandel coast, over one hundred and fifty miles from the sea.

The average price of cotton at its place of exportation in the United States was this year twelve cents per pound, including all kinds, and the quantity exported was about 19,400,000 lbs. The low price of material, and the high price of manufactured cotton, was favorable to the increase and profits of manufacturers.

The manufacture of woolen cloths continued to engage a large share of attention. Many factories were employed upon army and navy cloths, blankets, negro cloths, and other coarse fabrics, but the manufacture of broadcloths received an increased amount of attention. Mr. Rapp's colony, at Harmony, Pa., had, two years before, a flock of one thousand sheep, one-third of them merinos, and manufactured broad and narrow cloths, considered as good as any made in England. They could sell their best broadcloths, as fast as made, at ten dollars a yard. The Society then consisted of eight hundred persons, and had increased, by extraordinary industry, its original stock, since 1804, from $20,000 to $220,000.

An extensive broadcloth factory was this year erected at Walcottville, Ct., in which Governor Walcott of that state was a principal owner. Another manufactory of woolen cloths was established at Goshen, in the same county, by Louis M. Norton, and two associates, with a capital of $6,000, of which upward of one half was expended in its erection. They purchased wool at $1.50 per pound, and sold broadcloths, which, at the present day, would probably not bring over one dollar per yard, for eight to twelve dollars, one invoice of 178½ yards, having sold for the sum of $1,769.33, and another, of 255 yards, for $2,551.15, or upwards of ten dollars a yard. Notwithstanding the high prices obtained for their cloth, this little factory did not long survive the peace, and in common with many others, succumbed to the immense influx of English cloths which followed. It settled up, with the loss of its capital and three times as much more. Indeed, the charge of extortion, afterward advanced against the manufacturers of this period, on account of the prices obtained for their manufactures, had probably little foundation in fact, the advance in the price of raw materials, labor and expenses, having been greater than in the price of cloth. Broadcloths rose the next year to fourteen dollars per yard, and during the war were as high as eighteen dollars a yard, but wool also advanced in the next year to three and four dollars a pound, and indigo to four dollars a pound. As the labor of mechanics was scarce, because everywhere employed to the utmost, there is reason to believe that the percentage of profits was not increased in a ratio with the price of cloths, and that manufacturers generally, throughout the war, did not make greater profits than the mercantile and agricultural classes, by whom the charge was preferred. But the profits of all were large, and the general prosperity great.

Another woolen factory was built in Goshen, during the war, and the cloths made by the two factories, though greatly inferior to those of the present day, obtained considerable local reputation for durability, fineness, and elegance of style. The county (Litchfield), in 1819, contained eight woolen and four cotton factories, fifty carding machines, and forty-six cloth dressing establishments. It was also the seat of an extensive iron manufacture, having thirty-nine forges, many of them large, beside various minor branches of industry.

One of the earliest broadcloth mills in Massachusetts was about this time erected by E. H. Derby, of Salem, who, two years before, shipped at Lisbon a flock of eleven hundred merino sheep, of the Montarco breed, of which two-thirds reached New York, and were sent to his farm at Ten Hills, near Boston. A company was incorporated for the manufacture of woolens, at Billingham, Mass., with a capital of $400,000. The woolen manufactures of the country were still insufficient to meet the sudden demand for articles suitable for the army and navy, and the government was compelled, in the course of the year, to purchase of foreign manufacturers, chiefly British, at the current high prices, naval and army cloths, blankets, etc., to the value of $593,076. Large quantities also found entrance into the country through clandestine channels.

Cotton was this year manufactured by Phineas Whiting and Josiah Fletcher, in Chelmsford, Mass., the eastern part of which is now the city of Lowell. They erected, at a cost of about $3,000, a large wooden factory, on the Concord river, at Wamesit Falls, and five years after transferred the building and water privilege to Thomas Hurd, who erected a brick edifice, and converted both into a woolen factory, which run fifty power looms, and in 1826 was burned and rebuilt on a larger scale. In 1828 it became the property of the Middlesex Company, and Fletcher, Whiting & Co. transferred their business to Northbridge, Worcester county.

The most interesting event of this year was the incorporation, in February, of the Boston Manufacturing Company, and the completion, late in the year, of a cotton manufactory at Waltham, Mass., with about seventeen hundred spindles, in which the successful use of the power loom and all the operations for converting raw cotton into finished cloth, were for the first time introduced in this country, and probably in the world. Cotton mills in the United States up to this time had been principally for spinning, the weaving being done elsewhere, in hand looms, and in England the power looms were used in separate establishments. This enterprise, from which the cotton manufacture on a large scale in the United States dates its origin, was mainly due, as we learn from a pamphlet sent us by its author, the late Hon. Nathan Appleton, to the genius and and energy of Francis C. Lowell, Esq.[1] To that portion of Chelmsford, whither his associates afterward transferred their operations, the name of Lowell was given by them after his death, as a fitting acknowledgement of his agency in the undertaking. Mr. Appleton, whose long connexion with the cotton manufacture began here, was associated with the enterprise from the first, and was an original stockholder to the amount of $5,000. The stock of $400,000, only one-fourth of which was designed for immediate use, was principally taken by Mr. Lowell, Patrick Tracy Jackson, of Boston, an enterprising merchant, who relinquished trade to take the management of the concern, and the brothers of Mr. Jackson. The company purchased the water power of Bemis's paper mill at Waltham, and built the factory originally for the purpose of weaving cotton fabrics by the power loom. It was, however, deemed more profitable to do their own spinning, and the mill was started for that purpose. The power loom, already referred to as the invention of Mr. Lowell, was added in the following year, and worked quite successfully from the first. The engineer department was entrusted to Mr. Paul Moody, a machinist of acknowledged skill. The loom, which was the principal feature of this establishment, was found to differ considerably from English power looms. "The principal movement was by a cam, revolving with an eccentric motion, which has since given place to the crank motion, now universally used; some other minor improvements have since been introduced, mostly tending to give it increased speed." The patent dressing machine of Horrocks, of Stockport, England, of which Mr. Lowell had procured a drawing, was added

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(1) Introduction of the Power Loom and Origin of Lowell, by Nathan Appleton.—*Lowell*, 1858.

as a necessary accompaniment of the power loom, and received essential improvements, which more than doubled its efficiency. It is still in use. The stop motion for winding on the beams for dressing, also originated with this company. Other valuable improvements were made in the machinery, of which the most important was the double speeder, to regulate the movements of the fly-frame in filling the spool, for which Mr. Lowell performed the nicest mathematical calculations. This, with other improved mechanism, was constructed by Mr. Moody, and patented in 1819, and the two following years. It gave rise to several suits at law for infringement of the patent.

The description of goods first made by this company, at Waltham, was heavy unbleached sheetings of No. 14 yarn, thirty-seven inches wide, forty-four picks to the inch, and in weight something less than three yards to the pound. They were of the kind which has since formed the staple of American cotton manufactures for domestic use and exportation. They were offered at the only shop for the sale of domestic goods, then kept in Boston, that of Mr. Isaac Bowers, on Cornhill, but though praised, they found no purchasers.[1] They were then sent to the store of B. C. Ward & Co., importers of British goods, of which Mr. Appleton was the capitalist, and by them were offered at auction, through a Mr. Forsaith, who sold them rapidly for something over thirty cents, at which they long continued to be sold. B. C. Ward & Co. became the selling agents of the Company at the low commission of one per cent., which continued to be the established rate when large sales had made it highly profitable. Mr. Lowell died in 1817, at the age of forty-two, after having introduced into the Waltham factory, of which he was the informing soul, all the arrangements for the complete manufacture of cotton cloth in the same building. The system introduced by him, including careful provision for the moral character of the operatives, is still preserved in many of its details. His partners and associates were also men of great talent and energy.

A cotton mill was built this year at Plympton, Mass., and another at Enfield, which was sold, in 1821, to D. & A. Smith, and having been burned in 1836, and rebuilt, became, in 1852, the property of the Swift River Company, for the manufacture of woolen goods. The manufacture of cotton and wool cards was also commenced at Enfield, and continued until 1851, when it was removed to Holyoke. "Quobbin Whetstones" had been a principal article of export since 1790. The Franklin

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(1) In the New York Exhibition of 1853–4, Mr. Hagerson exhibited a specimen of British calico, purchased in Boston by him, in 1813, at eighty-five cents a yard. It was thirty-three and a half inches wide, and the same quality could be bought, in 1854, for three and a half cents a yard, such had been the progress in manufacturing skill.

Manufacturing Company, at Franklin, Mass., was also incorporated—capital $200,000.

The cotton mills of Providence and its vicinity were at this time running about 120,000 spindles, and made about 11,000 lbs. of yarn weekly They consumed 6,000,000 lbs. of cotton in a year.

In Baltimore and vicinity, where the marshals reported eleven cotton mills, with 9,000 spindles, in 1810, preparations were making to run 1,500 to 2,000 more, before 1st January. Messrs. Worthington, Jessop, Cheston, and others, took up water rights on Gwinn's Falls, for the erection of the Calverton mills, four miles west of the city. A large woolen factory was about this time erected at the same place by the Franklin Company. A paper mill had been in operation there since 1802. The Athenian Society of Baltimore sold, the last year, American goods to the value of $80,893.

In the State of New York, a large amount of capital had, for a number of years past, been annually invested in turnpike roads, toll-bridges, water companies, banks, etc., through the medium of joint stock companies. About one hundred and eighty turnpike companies, exclusive of several whose charters had expired, had been incorporated previous to the middle of April of this year. This business having been found to be somewhat overdone, the circumstances of the country directed enterprise as strongly toward corporate associations for manufacturing purposes. Among the objects, the manufacture of cotton and wool greatly predominated. The following charters were granted this year, under the general manufacturing law of 1811. To the Manlius Cotton and Woolen, Litchfield Iron, Ulster, Stamford, Fishkill Woolen, Pine Grove Woolen, Whitestown Cotton and Woolen, Western Woolen and Linen, Paris Friendly Woolen and Cotton, Broome Glass, Schenando Cotton, Paris Farmer's Woolen, Broome County, New York Eagle, Verbank Woolen, Homer Cotton, Beekman Cotton, Hanover Cotton, Salisbury, Susquehanna Cotton and Woolen, Otsego Cotton, Glen's Falls, Burlington, Eagle Cotton, Elm Grove Woolen and Cotton, Ticonderoga Iron, and Wharton Creek Manufacturing Companies, Societies, and Associations. Special charters were also given to the Flushing Manufacturing, the Urtica Whittlowi, the Otsego Card and Wire,[1] the Lake

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(1) A manufactory of wood screws went into operation this year near the Cohoes Bridge, in Watervliet, Albany county, and opposite Lansingburg. A set of machinery, invented by a self-taught mechanic, Wm. C. Penniman, and driven by water power, was erected to draw the wire, which had been previously imported, and thus to furnish the screws from iron in the bar. The company was incorporated with adequate capital. A bell foundry and brass works in the town made brass cannon on contract for the State of Connecticut, and a considerable variety of other works, as plated wares, surveyor's compasses, etc., of superior quality.—*Spafford's Gazetteer.*

Champlain Steamboat, the Dutchess County Marble, the Canandaigua Mechanics', the New York Commission, and the Alleghany Coal Companies.

The following were included in a list of a hundred and seventy-nine patents issued this year. To Stephen Dempsey, New York (Feb. 4), for acetate of copper; Geo. W. Robinson, Attleboro, Mass. (March 17), for brass, copper, and composition nails; Jacob Perkins, Newburyport, Mass. (March 23), two patents, one for bank vault locks, and one for manufacturing the shanks of screws. Five other patents were given for cutting and making screws, two of them to Abel Stowell, Worcester, Mass. (Feb. 4 and July 15), for making and finishing the heads of screws. The others were to Jacob Sloat, of Ramapo Cove, N. Y.[1] (May 4); John Hames, Richmond, Va. (Dec. 30); and A. Burnham and T. S. Barnum, Sharon, Ct. (Dec. 31). J. Perkins received, in connection with G. Murray, of Philadelphia, another patent (June 25), for an improvement on Perkins' dies; and another (June 29), for a copper and steel plate printing press. Three other patents for printing presses were taken by William Elliot, New York (Feb. 17); printing press and ink distributor, Zach. Mills, Hartford, Ct. (Feb. 26), and Daniel Pierson, Newburyport, Mass. (July 16); Daniel Pettebone, Philadelphia (May 6), plane irons and scythes; T. Norton and G. Biddis, Milford, Pa. (April 15), carding, spinning, and roping. This machine carded and spun wool at one operation, without making it into rolls, and at the rate of a pound in twenty-five minutes, with seventeen flyers, in its imperfect state, before it was patented. Thomas Blanchard, Sutton, Mass. (May 4), horizontal shearing machine; William Shotwell and Arthur Kinder, of New York (July 23 and Nov. 4), for hair cloth, spun from the hair of neat cattle. The patentees had in operation at Rahway, N. J., early in the ensuing year, a large factory for making coarse fabrics called *Taurino* cloth and carpets, from the hair of cows and oxen, with a small admixture of sheep's wool. They had a capital of $400,000, and in the infancy of the business were capable of making five hundred yards of cloth daily. It was continued a number of years. Hez. Steele, Hudson, N. Y. (Sept. 8), paper hangings with satin ground; John Warely, Albany, N. Y.

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(1) Ramapo, or Pierson's Works, in Hampstead, on the road from New York to Albany, consisted at this time of a forge or bloomery (of which there were five in the town and and twelve in the county), a rolling and slitting mill, and an extensive nail works, which, in 1810, made one million pounds of nails. They belonged to J. G. Pierson & Brothers, and employed one hundred and fifty men, and gave support directly and indirectly to nearly eight hundred persons. Dater's Works, two miles above, with six forge fires, employed one hundred and forty men. Nearly twenty-five years after, patents were again taken out for screws by Mr. Sloat, and by J. H. Pierson of these works, established in 1798 by J. G. Pierson, one of the first patentees of nail machinery on the records.

(Oct. 13), forming wool and rorum hats; Eb. Harrick, Stockbridge, Mass. (Oct. 22), a stocking loom, the first we believe recorded; Eb. Jenks, Colehook, Ct. (Nov. 13), elastic steel card teeth, fish hooks, etc.; Thomas Ewell, Georgetown, D. C. (Dec. 7), manufacturing gunpowder. The patentee claimed three important improvements, by which the risk, waste, and expense were diminished one half. They consisted principally in boiling the ingredients by steam, in the use of a wheel for incorporating them, and in a mode of granulating the powder. He offered to manufacturers the right of using the first two, and to furnish the wheel for $1,000 for every one hundred pounds made in a day, none less than three hundred pounds. For the use of the granulating machine, which he also put up, he demanded, for the first year the whole saving made by discontinuing the sifter, one half the saving for the second year, and one fourth for the third and fourth years.

The American naval force on the Atlantic stations consisted, on 4th March, of thirty-three vessels; independent of gunboats, only twenty-seven of which were in actual service. The whole coast, from the

1814 Mississippi to Long Island, being in a state of rigorous blockade, according to the proclamation of Admiral Warren, at Halifax, in 16th November, 1813. The attention of the Coast and Harbor Committee of New York, and of the President of the United States, was drawn by Robert Fulton to a model plan and specifications for the construction and armament of a floating steam battery or frigate of war, for harbor defence, in favor of which he obtained the certificates of many prominent naval commanders. This destructive engine, to be called the Demologas, in addition to a powerful battery, and the means of discharging a vast column of hot water upon the decks of an enemy's vessel, was fitted with furnaces for heating, red hot, shot or balls of one hundred lbs., to be thrown by submarine guns into her hull, below the water line. On the 9th March, Congress appropriated $320,000 for building one or more such batteries, under the superintendance of a sub-committee of five, with Mr. Fulton as engineer. The keel was laid 20th June, and on 29th October the first steam vessel of war ever built, named Fulton the First, was safely launched from the shipyard of the contractors, Adam & Noah Brown, in New York. Her keel was one hundred and fifty-six feet, breadth of beam fifty-six feet, depth twenty, diameter of wheel sixteen feet, and capacity 2,473 tons. The bulwarks of her main deck were fourteen feet ten inches thick, of solid timber, and pierced with thirty-two port-holes, for thirty-two pound guns. Her engine, of forty-eight inch bore, and sixty inch stroke, was put on board on the following May, previous to which time her ingenious projector had ceased to exist (Feb. 24), leaving also, unfinished on the stocks, an improved submarine vessel, which he was building under executive authority, and which none of the mechanics were able to complete according to his plans. The steam frigate Fulton gave complete satisfaction, and on her trial trip in July made six and a quarter miles an hour, and afterward, in November, with her full armament, five and a half miles, drawing eleven feet of water. The peace having been ratified in the mean time, she was made a receiving ship until June 4, 1829, when she unaccountably blew up, killing and wounding a number of persons.

Congress, on 20th November, ordered twenty additional vessels, of eight to sixteen guns, to be built or purchased. Of those ordered in the last year, three were built during this year, at Vergennes, Vt., whence the lake fleet of McDonough was fitted, and sailed in September. Of one of these ships, the Saratoga, one hundred and sixty feet long, twenty-eight guns, and five hundred tons, the timber was all standing in the forest on 2d March, the keel was laid on the 6th, and the vessel was launched on 11th April.

The more peaceful fruits of the genius of Fulton and of our naval architects were witnessed this year, in the first passage of a steam ferry boat between New York and Long Island, that of the Nassau, which cost $33,000 and commenced running on the first of May. Fulton also built at Pittsburg, for a company at New York, Philadelphia, and New Orleans, the steamboat Vesuvius, of 340 tons. She was intended for the Louisville and New Orleans trade, and sailed in the spring from Pittsburg, being the third boat built in the west. In July, with a cargo, she made one half the distance from New Orleans to Louisville in ten days, which was regarded as nearly a demonstration of the ability of loaded boats to stem the current of the largest rivers by steam. The Enterprise, of seventy-five tons, also built this year at Brownsville, Pa., with an engine made at Bridgeton, under D. French's patent, took a load of ordnance to New Orleans, in December, and afterward made six hundred and twenty-four miles in six and a half days. This vessel was the first that ever ascended from New Orleans as far as Louisville, which she reached, in May 1816, in twenty-five days. She was commanded by Captain Henry M. Shreve, the inventor of the steam snag boat, to whom the citizens of Louisville gave a public dinner on the occasion. To Captain Shreve the western people considered themselves most indebted, next to Fulton, for the early establishment of steam navigation on their rivers, for having, in December of this year, on the first visit of the Enterprise to New Orleans, and subsequently with the Washington brought to a legal test, the claim of Fulton and his partners to a monopoly of the use of steam propulsion. Both boats were seized, as the captain desired, and the trial having been carried up to the supreme bench, resulted in the overthrow of the exclusive pretensions of the prosecutors. There was at this time but one steamboat in Great Britain, the Clyde. The new vessels built this year amounted to only 29,039 tons. The Embargo Act of December 1813 was repealed by Congress on 14th April.

The high prices of manufactures, raw materials, labor, and real estate, at this time, were the result in part of the war, and the suspension of foreign trade. They were, however, still more a consequence of the speculative disposition which had prevailed for several years in the Middle States, and were stimulated at this time by the fiscal measures resorted to by the government to carry on the war, by means of heavy loans, and an immense use of treasury and bank issues, which became rapidly depreciated in value. After the failure of the United States Bank to obtain a renewal of its charter, public and private banking institutions, and even manufacturing and bridge building associations had been rapidly organized, in the expectation of creating wealth by the facile process of emitting paper notes, rather than from the slow proceeds of industry and labor. So rife had this spirit become, that in Pennsylvania a law was enacted, in March 1810, restraining incorporated associations from the issue of notes, or performing other functions of a bank, but without effectually checking the evil. The only corrective to over-issues of paper money by the banks, the return of the notes for payment, was in a great measure removed by the war, which put a stop to the annual exportation of specie for the China and India trade. The banks then entered upon a system of wholesale issues of worthless paper, and of credits to the government, and to individuals, far beyond the limited requirements of the foreign trade. In New England, which was exempt from the rigors of the blockade, and carried on considerable foreign trade in neutral vessels, more stringent laws existed on the subject of banks, which preserved its currency from depreciation, and caused a continual drain of specie from the Middle States, and from the South and West, which also participated in the prevalent infatuation. In Pennsylvania a bill passed both Houses, in the Session of 1812–13, for the incorporation of twenty-five banking institutions, with capitals amounting to over $9,500,000, and having been returned by the Governor, was reconsidered and lost. The application was renewed in this year, and forty-one banks, representing $11,500,000 of capital, were authorized by a large majority in the Legislature, and after having been also returned by the Governor, was finally passed by a two-third vote, on 19th March. Of these thirty-seven went into operation. On the 29th August, at which time specie bore a premium of fourteen to twenty per cent., and a principal bank in Philadelphia found its specie reduced, since the 4th January, from $1,201,831 to $144,640, a general suspension of specie payments was declared by the banks of that city, in which they were followed, on 1st September, by those of New York and Maryland. This suspension continued nearly three years, during which the currency suffered still further discredit to a vast amount, with a corresponding drain of specie, a general inflation of prices, the utter derangement of business, and much eventual loss to the community. The commissioners, which met at Ghent, in August, signed a treaty of peace and amity between England and America, on 24th December, which was ratified by the President in February following.

The total value of domestic exports this year was only $6,782,000, and of articles of foreign origin $145,169. Of the former, manufactures constituted a value of only $411,000. The average annual value of domestic exports for the last five years was $30,618,196, or more than twelve per cent. below that of the preceding five, and a sixteenth below that of the five years from 1795 to 1799.

On the 9th of August the first ark load of twenty-four tons of Lehigh coal, from the Summit mines of Mauch Chunk, was shipped by Messrs. Miner, Cist, and others, and reached Philadelphia on the 15th, at a cost of fourteen dollars per ton. With much difficulty families and smiths were prevailed upon to make the experiment of using it. Several persons bore public testimony this year to its superiority for welding gun barrels, etc.

A duty of twenty cents a gallon on all spirits distilled within the United States, whether from domestic or foreign materials, in stills or boilers, was imposed on 21st December, in addition to those laid by the act of 24th July 1813. Additions were also made to the licenses payable by the former act.

The quantity of saltpetre made annually in Kentucky during the war, was upward of 400,000 lbs., and of gunpowder about 300,000 lbs. Saltpetre was obtained from the numerous limestone caves, in which the earth was so strongly impregnated as to yield often fifty pounds of nitre to every one hundred pounds of earth, and the latter, if returned after leeching, in a few years regained its former strength. The counties most productive in this article were Barren, Rockcastle, Montgomery, Knox, Estle, Warren, Cumberland, and Wayne, of which the last produced from 50,000 to 70,000 lbs. a year. A contract was made this year to supply $20,000 worth from the Mammoth Cave in Edmonson county. The state produced, in 1810, 201,937 lbs. of saltpetre, and Tennessee 162,426 lbs., Virginia 59,175, and Massachusetts 23,600, making nearly half a million pounds of home-made saltpetre, which, with the capacity for increasing the product, and the number of powder mills, were supposed to be adequate sources of supply.

A settlement, called New Harmony, was this year made on the Wabash, fifty-four miles below Vincennes, by George Rapp, and the community of Harmonists, who sold out their land and improvements in Butler county, Pa., for $100,000, with the view of cultivating the vine and raising merino sheep, under more favorable circumstances. Upon their new purchase, held, like all their property, in common, and in the name of Mr. Rapp, they erected a beautiful village, an extensive cotton and woolen manufactory, a brew house, distillery, steam mill, etc., and cultivated the vine with considerable success. Their cloth, made of merino wool, was considered equal to any made in the country. The unhealthfulness of the climate, however, compelled them, at the expiration of ten years, to remove, and they purchased another large tract of land on the Ohio, at Economy, in Beaver county, Pa., where they once more renewed the scenes of industry and skill, which everywhere attended their labors. The property in Indiana was sold for $190,000, to Robert Owen, the socialist.

The Zanesville Canal and Manufacturing Company, was this year incorporated—with banking privileges—for the construction of a canal and locks around the falls of the Muskingum, at an estimated cost of $70,000 to $100,000, and for the manufacture of iron in all its branches, cotton, wool, hemp, flax, paper, etc., by the water power of the rapids at Zanesville. Four miles above the town, on the Licking river, were a furnace and forge, carried on pretty largely by Dillon & Son, which were probably the earliest in the state. The census of 1810 returned three furnaces, one in Columbiana, one in Muskingum, and a furnace and forge in Trumbull, which together made 1,187 tons of pig, and fifty tons of bar iron. There were also twenty-four naileries. Coal was found abundantly in several parts of the state. Large quantities of maple sugar were made in the state, amounting, in 1810, to over three millions of pounds. The town of Aurora made, in the spring of this year, seventeen tons.

A cannon foundry, the beginning of the Fort Pitt Iron Works, was this year established at Pittsburg, Pa., by Joseph McClurg, at which the first cannon were made on contract for the fleet on Lake Erie, and for the defence of New Orleans. The first guns were cast at the old Pittsburg foundry, corner Fifth and Smithfield streets, commenced ten years before by McClurg, and they were finished at the new foundry, at the corner of Etna and O'Hara streets, where for several years the boring machinery was driven by horse power. There were then but three or four steam engines in the city or neighborhood. The works have continued the manufacture of cannon to the present time, and have produced many of the heaviest columbiads in the world.

Iron works were this year erected on French street, Baltimore, by Robert and Alexander McKim, to be driven by steam power. The price of solid castings at this time was about five cents a pound, and of hollow ware sixty dollars a ton. Bar iron cost as high as $150 the ton.

A petition presented to Congress in March, by Elijah Waters & Co. and others, inhabitants of Sutton, Millbury, Oxford, and Dudley, in Worcester county, Mass., praying for a duty on imported scythes and mill saws, stated that the manufacture of scythes was a flourishing and increasing business in those towns, which, in 1810, had eleven shops in which they were made, nine of them in Sutton, and two in Oxford. Seven others had been erected since, some of which could make one thousand dozens of scythes annually. The business had increased in nearly an equal degree throughout the state, and probably through the Northern States generally. Mill saws were also made to a considerable extent in that vicinity, and in other parts of the Union, and they believed the Union could be supplied with the domestic article, if the protection extended by the war was continued after its termination. Mill saws, mill irons, and scythes, were made at this time, somewhat extensively, by S. & A. Waters, at Amsterdam, in Montgomery county, N. Y. The works were erected at a cost of $6,000, and the sales amounted annually to $8,000 or $10,000, including about 6,000 grass scythes, all of which bore a high reputation.

The manufacture of steel, edge-tools, castings, iron ware, and sundry articles of hardware, had been already greatly extended and improved, by the suspension of foreign trade. That of wire making was considered well established.

The price of hemp increased from $210 per ton, in the last year, to $250, and $275 in the present. The high price of all materials, except cotton, which was not above thirteen cents per pound during this year, led to an extended cultivation of flax in Washington county, N. Y., in which James Whiteside, of Cambridge, led the way, and was soon followed by others. Its culture was found profitable at the current price of eighteen and three-quarter cents per pound. Washington and Rensselaer counties, particularly the valley of the Hoosic, have ever since been the principal flax region of the state, which in 1845 had 46,000 acres in flax, and produced 2,897,062 lbs. The culture was much promoted by the number of oil mills in the district, and the profitable exportation of flax-seed to the linen districts of Ireland, whence the first cultivators in Cambridge were derived.[1] An incorporated linen factory was in operation at Schaghticoke.

(1) Fitch's Survey of Washington County.

The manufacture of carriages was commenced during the last or present year, in Albany, by Mr. James Gould, who soon after added that of stage coaches. The business was also begun this year at New Haven, Ct., by Mr. Brewster, whose efforts to promote the moral and intellectual character of his workmen, by lectures delivered to them by himself and by Professors Olmsted, Silliman, and Shepherd, on scientific and mechanical subjects, at his expense, deserve mention no less than his eminence as a manufacturer. The business in all its branches has been ever since extensively conducted by these men or their representatives, and both the cities named, and their neighborhood, have long been principal seats of that business.

Chemical manufactures, which received their first prominent establishment in the United States, during the political troubles of this period, received considerable aid from the chemical and metallurgic skill of Dr. Erick Bollman, a scientific Dane, resident in Philadelphia, who introduced Wollaston's method of working crude platinum into bars, sheets, and other forms, serviceable in the arts. He succeeded in plating iron and copper with that metal, of which there chanced to be in the county a considerable and cheap supply, for which there was no demand. He also prepared the silver-colored metallic lustre or glaze for porcelain, with the oxide, and about this time made, for Mr. John Harrison, an enterprising manufacturer of oil of vitriol, the first platinum still used in the country for concentrating the acid. This use of the metal had been only recently introduced in Europe. The still weighed seven hundred ounces, and contained twenty-five gallons, and was in use about fifteen years. We believe he afterward applied it to the manufacture of crucibles and plates, or slabs, for glass-workers. A glass manufactory was this year incorporated in Keene, N. H., where it is still a principal business. The chief materials were abundant in the town.

The manufacturing business of Paterson, N. J., where little had been done, although several water privileges had been leased, since the failure of the first Company, and the destruction of their factory, in 1807, was about this time permanently revived by Mr. Roswell L. Colt, of Hartford, a son of the former superintendent of the Company's affairs. He purchased this year, at a reduced price, the principal shares, and reanimated the association. The admirable water power of the Passaic Falls at this place, was improved with much judgment by a dam, basin, guard-gates, and canals, supplying, on three separate planes of different elevation, the whole head and fall of twenty-two feet to mills on each side, without any inconvenience of back water. The expense of the improvements, amounting to $40,000, and of keeping them in repair, was borne by the Company, and Paterson became, in a few years, one of the principal manufacturing towns of the Union. With a short intermission after the peace, its progress has been uniform since that time.

The county of Essex, N. J., contained, in May of this year, twenty cotton mills, and it was expected that before the first of September there would be 32,500 spindles in use, making 30,000 lbs. of yarn, which, converted into cloth, would sell at forty cents a yard, giving a yearly value of $1,672,000. Within four years after, the county had in operation ten woolen factories, making cloth to the value of $650,000 per annum. Paterson, at the same time, had five cotton factories, mounting 20,000 spindles.

Mr. William Gilmour arrived in the United States about this time from Glasgow, bringing with him patterns of the power loom and dressing machine, in use in that country. He was invited to Smithfield, R. I., by Mr. John Slater, who wished to have these valuable machines constructed, but was unable to obtain the consent of all his partners. He remained two or three years engaged in mechanical labors for the Company, during which time he introduced, to the great advantage of the business, the hydrostatic press of Bramah, for pressing cloth. At the invitation of Judge Lyman, of Providence, he subsequently removed to that place, where the machines were constructed for him and others, and from whom he received a compensation of fifteen hundred dollars.

The price of cotton yarn, which, in 1810, was worth, on an average, one dollar and twelve and a half cents per pound, was this year worth less than one dollar, partly in consequence of improvments in machinery.

The second steam engine in Providence, one of twenty-four horse power, by Evans, was this year erected by Messrs. Whitney & Hoppin, in one of the buildings recently standing, of the Providence Dyeing, Bleaching, and Callendering Company. It cost $17,000, a large part of which was for transportation from Philadelphia.

The ardor with which manufacturing was engaged in at this time was manifested by the incorporation this year, by the General Court of Massachusetts, of thirty companies, for the manufacture of cottons, woolens, glass, files, wire, and other articles. About fifty companies had been incorporated in that state since 1806, principally for making cotton and woolen goods. Among those chartered this year was the Bellingham Cotton and Woolen Factory, on Charles river, with a capital of $15,000, and the Hampden Cotton Manufacturing Company, and one consisting of B. & W. Jenks, Joseph Bucklin, and others, who established at Jenksville, in Ludlow, Hampden county, a manufactory of cotton warps, to be woven in families, with woolen filling, according to the frequent practice of that day. The Company was not regularly organized according to its charter until December, 1831, when, by the name of the Springfield Manufacturing Company, it commenced an extensive manufacture of cotton, but failed, in July 1848, for a large amount. The first cotton mill in Franklin county was this year put in operation at Coleraine, by W. P. Wing. A woolen mill was built at Middlefield, Hampshire county, by William D. Blush, which was destroyed by fire in 1850. At Plympton, Plymouth county, a cotton and woolen factory was established, which manufactured this year about 15,000 pounds of wool.[1]

At Fishkill, Dutchess county, N. Y., where a woolen company had been previously incorporated, the first cotton mill was this year erected by Peter A. Schenck, Peter H. Schenck, and Henry Dowling. It was the foundation of the Matteawan Manufacturing Company, for many years the largest in the state. It was the only factory in the place until 1822, when the Messrs. Schenck, who had become sole owners, united with William B. Leonard, long favorably known as the agent of the Company, and erected another large manufactory, to which was added, in 1832, an extensive machine shop, etc.

The Literary and Philosophical Society of New York, established to promote the useful arts, diffuse knowledge, and enlighten the human mind, commenced its proceedings at this time.

The Manufacturing Company of Lancaster, Pa., went into operation this year, with a paid-up capital of $128,000, which was expended in buildings and machinery, and the manufacture of cotton yarn and cloth, until 1818, when its affairs were closed by the transfer of the whole to some of the parties interested, on payment of $34,000 of borrowed notes. It had thus sunk the whole capital, and was a striking example of the disasters which overtook many, in consequence of the flood of foreign goods which came in after the peace.

A large woolen manufactory, one hundred and twenty by forty feet, and five stories high, was built at Lexington, Ky., by James Prentiss & Co. It went into operation in 1816, and employed one hundred and fifty persons, but stopped during the financial troubles, about six years after. At the same place, which grew most rapidly at this time, a company was incorporated, in the winter of this year, with a capital of $50,000, afterward increased to $75,000, for the manufacture of white lead. It was owned by Messrs. Samuel Trotter, Levy, and others, and made annually from 80,000 to 120,000 lbs., with facilities for making 200,000 lbs.

Two hundred and seven patents, for new inventions, were issued this

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(1) Holland's Western Massachusetts.

year, among which were the following: to Daniel Pettibone, Philadelphia (Feb. 1), for twisted screw auger for boring guns; Charles Osgood, Salem, Mass. (Feb. 26), composition for black lead pencils; John McThorndike (March 7), making paper from pelts; Eb. Ford, Baltimore (April 14), a torpedo; Archibald Binney, Philadelphia (May 17), moulds for casting printers' types. This lever hand mould was in general use in the United States until superseded by power machines, and enabled a workman to cast six thousand in ten hours, or two thousand more than with the ring-tailed mould in use in Europe (see A. D. 1811). Benjamin Porter, Salem, Mass. (May 18), a brick press, the first recorded; Joseph H. Derby, Leominster, Mass. (May 26), cutting combs at a single operation, and to several others for comb-making; James Harrison, Boston (Aug. 22), time part of wooden clocks, and patents the same day to five others for different parts of clocks; Moses L. Morse, Boston (Aug. 22), for manufacturing pins of wire at one operation. This machine is said to have shown much mechanical genius, and was used to some extent, but being too intricate or delicate, and remaining unimproved in other hands, it fell into disuse, or was superseded by other machines. Wm. F. Hill, New York (Oct. 15), a needle and pin machine; Samuel Browning, Franconia, N. H. (Nov. 25), a magnetic cylinder (or separating machine). This machine, for separating granular magnetic iron ore, and titaniferous iron sand from its gangue, by magnetic attraction, was first patented, October 13,1810, and was renewed by act of Congress, March 3, 1831, having proved highly useful to iron manufacturers. Aug. Boulia, Philadelphia (Dec. 21), a permanent color for calicos.

For the support of government, and the discharge of the public debt, Congress, on 18th January, enacted, that after 15th April, the following internal duties should be levied on articles manufactured in the United States for sale, viz: upon pig, bar, rolled, and slit iron, one dollar per ton, on castings one dollar and fifty cents; nails, brads, and sprigs, other than wrought, one cent per pound; wax candles, five cents; mould candles of tallow, etc., three cents; hats, caps, and bonnets, and umbrellas and parasols, above two dollars in value, eight per cent. ad valorem; paper, three per cent.; playing and visiting cards, fifty per cent.; saddles and bridles, six per cent.; boots and bootees, exceeding five dollars per pair in value, five per cent.; beer, ale, and porter, six per cent.; tobacco manufactured, cigars, and snuff, twenty per cent.; leather, five per cent. The duties which accrued from this source, during the current year, amounted to $793,625, and the amount received up to 22d February following, when the act was repealed, was $951,769. Duties were at the same time laid upon household furniture, gold and silver watches,

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and (July 27th), on gold, silver, and plated wares, jewelry and pastework, all of which were repealed the next year.

On the 10th February, the President, by special message, laid before Congress a copy of the treaty of peace and amity, between the United States and Great Britain, signed at Ghent, on 24th December, and since ratified by both parties. On this occasion Mr. Madison remarked, "The most liberal policy toward other nations, if met by corresponding dispositions, will, in this respect (in relation to commerce), be found the most beneficial policy toward ourselves. But there is no subject that can enter with greater force and merit into the deliberations of Congress than a consideration of the means to preserve and promote the manufactures which have sprung into existence, and attained an unparalleled maturity throughout the United States, during the period of the European wars. This source of national independence and wealth I anxiously recommend therefore to the prompt and constant guardianship of Congress."

In conformity with this recommendation, Congress, on 3d March, repealed the discriminating tonnage and other duties, in favor of such foreign nations as should abolish their countervailing duties, in favor of the United States.

On the 3d July, a convention was held at London, by the terms of which it was agreed to equalize the duties on tonnage and imports, so that the produce or manufactures of the one country could be imported into the other, in the ships of either, upon equal terms, and the same as those of the most favored nation. This treaty was reciprocal only so far as it related to the British territories in Europe, and the East Indies, and did not secure to the United States equal privileges in the British colonial trade in America. Congress, on the 1st March following, repealed all such parts of existing laws, laying duties on tonnage and imports, as were inconsistent with the provisions of the convention. The treaty was renewed for ten years, on 20th October 1818, and again indefinitely on 6th August 1827.

The earnest appeal of the executive, in behalf of manufactures, was soon after importunately urged by the manufacturers, who saw the temporary protection they had enjoyed during the war suddenly withdrawn, and their heavy investments about to be engulphed in a common ruin, by the renewal of foreign trade, under enlarged privileges. Congress at length responded to the call by a more decided measure of encouragement than had yet been accorded to this branch of the national interests.

The privations experienced during the war had convinced many American statesmen of the impolicy of withholding adequate protection to the manufacturing classes. The remarkable spring given to manufacturers during the few years of non-intercourse and war, had clearly shown the capacity of the country for their most profitable extension. The development they had already received in various new branches, and in the aggregate was quite remarkable, and their almost total subversion, as in former periods, through passive neglect, became a subject of just apprehension.

From the peace of Paris, in 1763, to the adoption of the Constitution, was a period of twenty-six years, characterized by the Stamp Act, and various laws prohibitive of manufactures, a seven-years' war, countervailing commercial regulations, debt and embarrassed credits, during which the country laid the foundations of a diversified national industry, and considerably relaxed its dependence on foreign countries. From the organization of the new government to the second peace with England, was a like period of twenty-six years, in which occurred the several embargos and orders in council, twenty years of European and two and a half of American war, an enormous accumulation of debt and a reckless abuse of public and private credit, notwithstanding which, domestic manufactures had grown in a manner quite unexampled in the previous history of any country. They had at length taken a position as one of the principal sources of national prosperity. The great body of manufacturers, who had transferred millions of capital from other pursuits to manufacturing establishments, had already become alarmed at the effects upon their interests of the revival of manufactures abroad, which would follow the general pacification of Europe, and of the unrestrained influx of British goods upon a peace with England.

Immense cargoes of foreign manufactures were already crowding the portals of the nation before peace had thrown open the gates of commerce, and several petitions had gone up to Congress to avert the danger which was impending. Many branches of the domestic industry were yet new and imperfectly established, and few of the more recent enterprises had yet reimbursed the heavy expenses incidental to first undertakings on a large scale. Among the petitions presented to Congress early in the present year, was one from Thomas Gilpin and others, manufacturers of Philadelphia, on 25th July, against the introduction of goods subject to ad valorem duties, at one-fourth to one-half their real value, and asking a revision of the revenue laws, which they suggested might be found either in the substitution of specific for ad valorem duties, or in the establishment of a Board of Appraisers at each custom house, with power to decide on the value of merchandise entered.

So great were the importations of foreign goods which immediately followed the peace, that during the first three quarters of the present year, their value amounted to upwards of eighty-three millions of dollars, and for the fiscal year next ensuing, amounted to one hundred and fifty-five and a quarter of millions, of which value, over one hundred millions' worth paid ad valorem duties, about seven-tenths of the last named sums being in woolens and cottons. The duties that accrued during the present year from imports, notwithstanding the under-valuation, amounted to $36,306,022, a sum nearly equal to the total average value of domestic produce, annually exported during the twelve years immediately preceding the war, which was $38,500,000.

It was supposed to be an object worth large sacrifices on the part of English manufacturers to break down the formidable rivalship of growing but immature manufactures in America, by means of heavy consignments of goods to be disposed of at auction, and upon the most liberal credits, to the merchants. That this policy had, also, the approval of eminent British statesmen, was inferred from the remarkable language of Mr. Brougham in Parliament, soon after the peace, when he declared in reference to the losses sustained by English manufacturers in these transactions, that "it was even worth while to incur a loss upon the first exportations, in order by the glut to stifle in the cradle these rising manufactures in the United States, which the war had forced into existence, contrary to the natural course of things."

American merchants were in no wise averse to the encouragement of these excessive importations, and were lured by the large profits and ample fortunes realized by the first cargoes—some of which were at once sold entire for clear profits of fifteen, twenty, and twenty-five per cent., and in some cases as high as forty and fifty per cent. on large sales—to engage in extensive transactions. The greatest life and activity were at once given to all the avenues of trade, the shipyards were set at work, the banks, already relieved from the payment of specie, discounted most unsparingly, and thereby stimulated all classes to seek their fortunes in mercantile operations and the largest ventures.[1] The increased revenues from imports, and the activity imparted to commerce, appeared to furnish evidence of unusual prosperity, but were soon followed by a reversal of the flattering prospects. To a very large number of manufacturers, however, the enormous importations which burthened the warehouses of the merchants, and soon after fell greatly in price, were fraught with the most

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(1) Three package sales, which took place in June, July and August, 1815, on account of one merchant, amounted to $1,515,174. A single cargo was purchased for $300,000, divided into four notes each $75,000, all of which were discounted in different banks. The purchaser lost $80,000 by the speculation. The notes issued by one auctioneer, and those received by him for goods sold, extant at one time, and discounted at the different banks, amounted to $1,200,000. These facts exhibit a state of things portentous of an approaching hurricane, which soon burst with violence. As early as the close of 1815 a lamentable change took place, and goods experienced a ruinous fall. Goods at Passmore and Birkhead's auction store, which sold in August and September at the enormous advance of 200 to 230 per cent., sunk, in December, down to 90, 100 and 125.—*The Crisis, by M. Carey*, p. 34.

disastrous consequences. Many were compelled to close their factories, in which their whole capitals were invested. Many others who ventured to continue, became in the end hopelessly bankrupt. Large numbers of workmen were compelled to seek support in other pursuits, to which they were unaccustomed. The revival of the foreign demand for raw cotton raised the price of uplands from thirteen cents in 1814 to twenty cents in the present, and twenty-seven cents in the following year, and thereby still further reduced the profits of that branch, already nearly overwhelmed with British and India cottons, sold at or below cost in their own markets. Peculiar circumstances alone postponed for a time the more severe distresses which ultimately overtook nearly all classes.

One of the principal agencies by which our manufactures—that of cotton in particular—were enabled to survive the total ruin with which they were threatened, and eventually become thoroughly established, was the introduction of the power loom. Aided by that and other improved machines, the cotton manufacture of Great Britain had enabled her triumphantly to defend the liberties of Europe under the most onerous taxes throughout an exhausting war. Thus the mechanical combinations of a few ingenious minds became, in their results, more potent than the most powerful armies guided by consummate skill, and enabled a people, without utter ruin to important interests, to contravene the plainest maxims of political economy.

A power loom invented by F. C. Lowell, which cost about $300, was already in operation at Waltham, by the aid of which the proprietors stated to Congress, in the following year, that they were making a profit of twenty-five per cent., and stood in no need of further protection. The Scotch loom, of which patterns were brought to this country during the last year by Gilmour, was about this time constructed, at a cost of only $70, for several of the manufacturers of Rhode Island, who made a liberal subscription to Gilmour for the use of his drawings and instructions. This engine, which was considered superior to the Waltham loom, was constructed in about sixty days, at Pawtucket, by David Wilkinson, who added some improvements of his own, and commenced making them for sale. It was put in the Lyman Factory at North Providence. Its comparative cheapness enabled the small as well as large manufacturers to dispense with the hand looms, which were soon after superseded entirely for factory use, with a consequent increase of the cotton business, which without its aid would probably have been abandoned.

The extent and value of some of the interests which were imperilled at this time, is derived from two reports of the Committee of Commerce and Manufactures made to Congress in 1816.

The cotton manufacture of the United States employed this year

(1815) a capital of $40,000,000; males employed from the age of seventeen and upward, 10,000; women and female children, 66,000; boys under seventeen years of age, 24,000; wages of 100,000 persons averaging $1.50 each, $15,000,000; cotton wool manufactured, 90,000 bales, or 27,000,000 lbs.; yards of cotton of various kinds, 81,000,000; cost, at an average of thirty cents per yard, $24,300,000.

The woolen manufacture was supposed to have invested in buildings, machinery, etc., $12,000,000; value of raw material consumed, $7,000,000; increase of value by manufacturing, $12,000,000; making the value of woolen goods manufactured annually, $19,000,000; number of persons employed constantly, 50,000, occasionally, 50,000; total 100,000.

A memorial to Congress represented the cotton manufacture, within thirty miles of Providence, to employ, at the same time (Nov. 8), one hundred and forty manufactories, containing in actual operation 130,000 spindles; bales of cotton used annually, 29,000; yards of cotton goods of the kinds usually made, 27,840,000; the weaving of which, at eight cents per yard, amounted to $2,227,200; total value of the cloth, $6,000,000; persons steadily employed, 26,000.[1]

In the city and neighborhood of Philadelphia, there were employed at this time, in the cotton branch, 2,325 persons; in the woolen, 1,226 do.; in iron castings, 1,152 do.; in paper making, 950; in smithery, 750 do. The manufactures of Pittsburg employed 1,960 persons, and amounted to the value of $2,617,833. Nearly every part of the country exhibited a corresponding degree of prosperity at the return of peace.

In his annual message to Congress, on 5th December of this year, President Madison again urged the propriety of encouraging manufacturing in the following terms. "In adjusting the duties on imports, to the object of revenue, the influence of the tariff on manufactures will necessarily present itself for consideration. However wise the theory may be, which leaves to the sagacity and interest of individuals the application of their industry and resources, there are in this, as in other cases, exceptions to the general rule. Besides the condition which the

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(1) A meeting of stockholders and representatives of cotton establishments, was held in Providence, on 6th November, and a committee was appointed to assess the several factories one cent on each spindle, "for the payment of the expenses of an agent to proceed to the city of Washington, to enforce the memorial or petition of the cotton manufacturers." The Hon. James Burrill was employed as the agent; and Mr. John Waterman, in collecting the assessment and statistics, found the number of cotton mills, "in and near Providence," to be as follows: In Rhode Island, ninty-nine mills, with 75,678 spindles; in Massachusetts, fifty-seven mills, 45,650 spindles; in Connecticut, fourteen mills, 12,886 spindles; total, one hundred and seventy cotton mills, and 134,214 spindles.—*Dr. Stone's Census of Providence.*

theory itself implies, of a reciprocal adoption by other nations, experience teaches that so many circumstances must concur in introducing and maturing manufacturing establishments, especially of the more complicated kinds, that a country may remain long without them, although sufficiently advanced, and in some respects even peculiarly fitted for carrying them on with success. Under circumstances giving a powerful impulse to manufacturing industry, it has made among us a progress, and exhibited an efficiency which justify the belief, that with a protection not more than is due to the enterprising citizens, whose interests are now at stake, it will become, at an early day, not only safe against occasional competitions from abroad, but a source of domestic wealth, and even of external commerce. In selecting the branches, more especially entitled to the public patronage, a preference is obviously claimed by such as will relieve the United States from a dependence on foreign supplies, ever subject to casual failures, for articles necessary for the public defence, or connected with the primary wants of individuals. It will be an additional recommendation of particular manufactures, where the materials for them are extensively drawn from our agriculture, and consequently impart and insure to that great fund of national prosperity and independence, an encouragement which cannot fail to be rewarded."

The petitions which were presented early in the session, from the cotton manufacturers of Massachusetts and Rhode Island, asking a prohibition of coarse cotton fabrics, especially those from beyond the Cape of Good Hope, and increased duties on others, represented the trade as particularly embarrassed by the quantities of low priced India cottons, made of inferior stock, and badly manufactured, introduced by the revival of the carrying trade, and by the further abstraction of specie, already at a premium of fifteen per cent. It was stated that a single ship, the Princess Charlotte, arrived at New York on 15th June, from Calcutta, with nine hundred bags of sugar, indigo, spices, saltpetre, etc., and nearly six hundred tons of piece goods, selected for the American market. This quantity, at the large allowance of four ounces to the yard, and the average price of twenty-five cents a yard, would make about five millions of yards, worth $1,200,000, brought by a single foreign ship. The duty being ad valorem, yielded little revenue on the coarser fabrics in the largest quantities. The Massachusetts memorial, presented December 13, contained the first suggestion of a mininum duty on cotton, which was granted during the session. The Assembly of New Jersey was about the first legislative body which came to the relief of the manufacturers at this time. On the 15th October, acting upon the report of Mr. Dayton, from the committee to which was referred the petition of Charles Kinsey, and other cotton and woolen manufacturers, it resolved to abolish the tax upon spindles employed in the cotton manufactories.

At Newark, in that state, a manufacturer of coach lace employed at this time about twenty hands. His supply of "floss silk" (raw silk freed from the natural gum), was obtained from Connecticut, and was found to be both in strength and lustre "much superior to the best imported silk." The silk of Connecticut had been previously made chiefly into sewings, and the raw silk used for coach lace, tassels, and fringe, had been principally imported at an average cost of six dollars per pound, which was increased by the war to thirty dollars per pound. From this time forward, large quantities of raw silk were also required for the manufacture of Tuscan braid for hats.

The revival of commerce at this time caused unusual activity in ship-building, which had been remarkably depressed throughout the war. The number of vessels, of all classes, constructed during the year, was 1,314, and their united tonnage was 154,624, a greater amount than was built in any previous year, and more than five times that of the last year.

The jewelry manufacture of Providence, R. I., employed at this time about one hundred and seventy-five workmen, and the value of its products for the year was $300,000. It was nearly abandoned during the next two years, but was revived in 1818.

The extensive Orange Powder Works of Daniel Rogers, near Newburg, New York, went into operation about this date, and afterward became capable of making two hundred and fifty to five hundred thousand pounds of gunpowder annually. It occupied twenty-seven buildings in the various operations.

The law of New York, relative to the incorporation of manufacturing companies, enacted in 1811 (and continued by successive acts), was amended to include companies for manufacturing clay or earth for any uses whatever. It was extended the next year to include *pins*, and in the following, *leather*.

At least one hundred and fifty millions of card tacks were made this year, at Abington, Mass., and sold in Boston, New York, Philadelphia, and Baltimore, and some in more distant places. An extensive iron factory, at the Saco Falls, in Maine, was considered one of the most complete in the country. It included a rolling mill, and five superior nail machines, one of which, with the help of a boy of twelve or fifteen years of age, would make one hundred and fifty shingle nails, and a stronger one, one hundred of the largest nails in a minute. At the same place, in addition to a fulling mill and three grist mills, was a saw mill, with eighteen saws, which cut 36,000 feet of boards every twenty-four hours. The water power was thought sufficient for 2,000 mills and factories throughout the year, and its subsequent manufacturing importance was confidently predicted.[1]

At Haverhill, Mass., considerable manufacturing was done. It contained two cotton and two woolen factories, and produced large quantities of shoes and hats for exportation, horn combs, leather gloves, leather, etc., and employed constantly thirty men in the manufacture of plated ware for saddles and harness, previous to the tax upon that article.[2]

At Cincinnati, Ohio, which, in June of this year, contained about 6,000 inhabitants, and 1,100 public buildings and dwellings, were four cotton spinning establishments, most of them small, containing 1,200 spindles, moved by horse power. A large woolen manufactory, owned by the Cincinnati Manufacturing Company, and calculated to make sixty yards of broadcloth daily, went into operation in the winter of this year. It employed a steam engine of twenty horse-power. The town had produced handsome pieces of carpeting, diaper, plaid, denim, and other cotton fabrics. Two extensive ropewalks made small cordage and spun yarn. The latter had been exported for several years, as had also fur hats. No wool hats were made there. There were six tanneries, and a considerable manufacture of shoes, boots, and saddlery. Many deer skins were dressed in alum, and leather gloves and brushes were made. A manufactory of cotton and woolen machinery, established in 1809, had since made twenty-three cotton spinning mules and throstles, carrying 3,300 spindles, seventy-one roving and drawing heads, fourteen cotton, and ninety-one wool-carding machines, besides wool-spinning machinery to the amount of one hundred and thirty spindles, twisting machines, and cotton gins. Plated saddlery ware and carriage mountings of all kinds, every description of fashionable enchased jewelry and silver ware, swords, and dirks, mounted in any form, fluted or gilt, and clocks of every kind, were among its manufactures. Stone and marble work, pottery, household furniture, carriages, plane stocks, weaver's reeds, turned and other wood work, were made. A manufactory of green and window glass, and hollow glassware, was about to go into operation, and to be followed in the ensuing summer by another for white flint glass. Clean white sand for glass-making abounded at the mouth of the Scioto, but clay for crucibles was obtained from Delaware. An extensive steam flour mill, with four pairs of six feet burr stones, and an engine of seventy horse-power, capable of manufacturing seven hundred barrels of superior flour weekly, and a steam saw mill of the newest construction, with four saws in separate gates, each capable of sawing two hundred feet of board

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(1) Second Massachusetts Historical Collection, vol. 4, p. 184.

(2) Ibid., vol. 4, p. 121.

in an hour, were among the recent enterprises of this rising town. The Cincinnati Manufacturing Company had in operation a white lead factory, the third west of the mountains, the product of which was claimed to be superior to the imported, being free from whiting. The Company was about to add the manufacture of red lead. A sugar refinery was in course of erection, and there were several distilleries. Two breweries consumed 80,000 bushels of barley in the manufacture of beer, ale, and porter. Tobacco and snuff, pot and pearl ashes, soap of several kinds, and candles, were made and exported. A mustard manufactory, and a mineral water factory, were in operation. Two newspaper offices had an extra press each, for book printing, and had issued, since 1811, twelve different volumes of bound books, averaging two hundred pages each, in addition to pamphlets. The paper had been formerly obtained from Kentucky, but was now supplied by mills in the state.[1]

The lands, lots and dwelling houses in Ohio, were valued at $61,347,215. A manufactory of white, flint, hollow and other glassware, red lead and pearlash, was commenced at Wellsburg, in Western Virginia, and produced glass of superior quality.

In consequence of the high price of all imported drugs and dyestuffs, the trustees of the Massachusetts Society for Promoting Agriculture, offered premiums of $100 each for the greatest quantities, not less than three hundred, and one thousand pounds respectively, of woad and madder raised in the commonwealth, within two years, from 14th June 1814. The same sum was offered to the inventor of the most approved machine for threshing or separating grain (suitable for a medium farm), before June 1816, and seventy-five dollars for the best and cheapest machine for cutting straw or cornstalks, by horse-power, for fodder.

Trials made in England, in August and November, of American, and the most approved English ploughs, proved the latter to be superior in simplicity, and equally effective with the best in use then. The American ploughs were made under the directions of Judge Peters, President of the Philadelphia Society for Promoting Agriculture, and combined the best principles and powers of those in use in America, with especial regard to simplicity of construction, and were sent to Robert Barclay, Esq., of Bury Hill, near Dorking, where one of the trials took place. An American scythe and cradle, sent at the same time, proved superior in every respect, in the hands of an American cradler, to the Hainault scythe, used by an expert hand.[2]

The number of patents issued this year was one hundred and sixty-six, among which were nine to citizens of Connecticut, for button making,

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(1) Drake's Picture of Cincinnati.

(2) Memoirs of Philadelphia Society for promoting Agriculture, vol. 4, pp. 13, 160, 163.

viz: L. Merien, New Haven (Jan. 4), for turning and polishing; William Lawrence, Meriden (April 12), a lathe pin for turning wire-eyed buttons; John B. Collins, Meriden (April 12), single jointed pewter moulds for wire-eyed buttons; Anson Matthews, Southington (April 26), wooden moulds; Ira Ives, Bristol (Aug. 7), three patents, viz: for a holdfast while polishing, for setting eyes of metal in the moulds, and for smoothing and rending the eye of metal; Heman Matthews, Southington (Sept. 12), two patents for a machine for finishing, and for a machine for making wire neck buttons; Jacob Perkins, Newburyport (Jan. 16), cutting cylindrical nails, and another (Nov. 1), for an improvement on the foregoing; Sylvanus Tousley, Manlius, N. Y. (Feb. 7), cast iron sleigh shoes on wrought iron rods; Oliver Evans, Philadelphia (Feb. 7), by special act of Congress, a renewal of his patent for steam engines, granted February 14, 1804; S. Blydenburgh, and Hez. Healy, Worcester, Mass. (Feb. 20), a loom to go by water, steam, etc.; F. C. Lowell, and P. T. Jackson, Boston (Feb. 23), a loom (power), see page 213; Thomas Bakewell, Pittsburg (March 3), manufacturing glass; George Stiles, Baltimore (April 4), a floating battery steam ship; Cadwallader D. Colden, N. Y. (May 19 and again June 2), hydrostatic paradox, applied to move machinery; Henry Tanner, Philadelphia (July 1), etching end pieces of bank notes; John Eberts, Philadelphia (Sept. 8), fall-top gig; Lewis Enters and W. Zigler, Georgetown, D. C. (Sept. 28), light from stone coal gas; James Hale (Nov. 22), ardent spirits obtained from lime; L. Merritt and S. Rogers, New York (Dec. 27), relieving toothache by steam; Jesse Sprague, Cape May, N. J. (Dec. 27), a wind saw mill.

In consequence of the low price of cotton, and the high price of sugar, during the war, increased attention had been given by the planters in Georgia and Louisiana to the cultivation of the sugar cane. The success of the business in the latter state was no longer regarded as doubtful. Several improvements in the process of manufacture had been introduced, by which the quantity and the quality of the product had been increased. Mr. Dorosne, in France, had taught, in 1811, the use of animal charcoal, or bone dust, for discharging the color and impurities, in the place of vegetable carbon, used since 1805; and in 1812 Mr. Howard, in England, afterward the inventor of the vacuum-pan, had introduced, as a superior defecating agent, a preparation of alumina, known as Howard's finings. The ribbon cane, an earlier and hardier species than the Creole and Otaheite, previously cultivated, was also introduced about this time, from Georgia, and became thenceforward the favorite plant. The sugar lands of Louisiana yielded from one to two hogsheads, of one thousand weight each, to the acre, which sold

1816

for about $100 per hogshead. The crop, though uncertain, was on the whole considered more profitable than any other. A farm of one hundred and fifty acres employed about fifty hands, and produced 150,000 lbs. of sugar, worth, at eight cents per pound, $12,000, an average of $240 for each hand. One hundred acres of rice, with the same labor, only yielded $4,000, and two hundred and fifty acres of cotton produced about 6,000 lbs., worth, at fifteen cents per pound, $9,000. Indigo had been nearly abandoned for many years, and yielded, with the same labor, at one dollar per pound, about $7,000, and tobacco only $5,400. Cattle mills were exclusively used at this time. The cost of a mill, capable of grinding three hundred gallons per hour, and delivering two tons, or more, of sugar daily, was about $1,000, and the pestles, buildings, draft beasts, etc., for an establishment to make two hundred hogsheads, was at least as much more. The total crop of Louisiana, at this time, was about 1,500 hogsheads, which was increased in the next two years to 25,000 hogsheads.

This industry had become sufficiently important to claim the patronage of government, and on 5th January, a memorial was communicated to Congress, from Bernard Merigny, and other sugar planters of Louisiana, setting forth the importance of the business to the Union, the great expense and hazards attending it, and praying that "the same sound policy which has hitherto invariably excited the General Government to protect the growing manufactures of our country, and consequently made us, in many branches, completely independent of foreign nations, may be extended to the cultivation of the cane, and that the duties laid during the war on foreign sugar, rum, and molasses, be made permanent by law." By the tariff subsequently enacted, they were left in the enjoyment of three cents duty on sugar, a reduction of two cents from the double war duties.

The manufacture of Refined Sugar in the Eastern and Middle States, kept pace with the increase of population, and Congress, on the 1st February, continued, without limitation, the act of 20th July, 1813, imposing an internal duty of four cents on all sugars refined, and allowing a drawback of the duty, upon its exportation to a foreign country, in quantities of not less than five dollars' worth. In addition to the drawback, an allowance of four cents was allowed, April 30th, on every pound of sugar refined from foreign sugars, when exported as above. The quantity refined this year amounted to about 5,000,000 lbs., worth $1,000,000, and duties accrued thereon to the amount of $141,335, being nearly double the amount of duties in the previous year.

A large number of memorials and petitions were presented, early in the first session of the fourteenth Congress, by those interested in the manufacture, especially of cotton and wool, and also of glass, white lead, copperas, and chemicals of different kinds, olive oil and indigo, sugar, candles, etc., and the breeders of merino sheep, praying for the prohibition of, or increased duties on, foreign manufactures, whereby their own might be protected from the ruinous competition to which they were then subject.

The general interest awakened at this time, on the subject of legislative protection to manufactures, caused the opinions of public men, and particularly of Mr. Jefferson, as the head of a large political party, to be much canvassed. His views, as expressed in the Notes on Virginia, in 1785, were employed with effect, by the opponents of protection. In answer to a letter from Benjamin Austin, of Boston, on the subject, he stated in his reply, dated Jan. 9, that his opinions in view of the altered circumstances of the country and the policy of foreign nations, were as follows:

"We have experienced what we did not then believe, that there exists both profligacy and power enough to exclude us from the field of interchange with other nations; that to be independent for the comforts of life, we must fabricate them ourselves. *We must now place the manufacturer by the side of the agriculturist.* The former question is suppressed or rather assumes a new form. The grand inquiry now is, shall we make our own comforts, or go without them at the will of a foreign nation? He, therefore, who is now against domestic manufactures, must be for reducing us, either to a dependence on that nation, or to be clothed in skins, and live like wild beasts in dens and caverns;—I am proud to say I am not one of these. Experience has taught me, that manufactures are now as necessary to our independence as to our comfort; and if those who quote me as of a different opinion, will keep pace with me, in purchasing nothing foreign, when an equivalent of domestic fabric can be obtained without regard to price, it will not be our fault if we do not have a supply at home equal to our demand, and wrest that weapon of distress from the hand which has so long wantonly wielded it."

The public debt of the United States, contracted chiefly by loans for the support of the war, having increased since the 1st January 1812, from $45,855,070 to $123,016,375, additional measures became necessary to support the public credit. On the 5th February, the act laying double duties on imports during the war, was continued in force until 30th June; after which time an addition of forty-two per cent. to the duties then existing, was to be levied until a new tariff of duties should be established by law.

On the 13th February, Mr. Dallas, Secretary of the Treasury, in obedience to a resolution of the House, of 23d February 1815, transmitted to Congress an elaborate report, on the subject of a general tariff of duties, comprehending a view of its incidents upon the peace establishment, a statement of the general principles for reforming it, including the means of enforcement and a schedule of articles, with the rates of duty proposed for the consideration of Congress.

The annual revenue demanded for the service of government, was stated to be, in round numbers, about twenty-four millions, of which the Committee of Ways and Means proposed to raise by direct taxes upon lands, houses, and slaves, and by internal duties upon stills, stamps, refined sugar, carriages, licenses, sales at auction, and from sales of public lands, the sum of $6,925,000, leaving $17,075,000 to be raised by custom duties. This it was proposed to raise, by an addition of about forty-two per cent. upon the product of the single duties, in force on 1st July 1812, estimated at about $12,000,000.

The Secretary set forth the claims to protection of American Manufactures, which owed their existence, particularly those which had been introduced during the restrictive system and the war, exclusively to the capital, skill, enterprise and industry of private citizens. Their preservation from the ruin to which they would be exposed by foreign competition, became "a consideration of general policy, to be resolved by a recollection of past embarrassments, by the certainty of an increased difficulty of reinstating, upon any emergency, the manufactures which should be allowed to perish and pass away, and by a just sense of the influence of domestic manufactures upon the wealth, power, and independence of the government."

From the imperfect information he was able to obtain, the Secretary made the following classification of American Manufactures.

First.—Those which were firmly and permanently established, and which wholly or almost wholly supplied the demand for domestic use and consumption. They embraced the following articles—cabinet-ware and all manufactures of wood; carriages of all descriptions; cables and cordage; hats of wool, fur, leather, chip or straw, and straw bonnets; iron castings, fire and side arms, cannon, muskets, pistols; window glass; leather and all manufactures of leather, including saddles, bridles, and harness; paper of every description, blank books; printing types.

Second.—Manufactures which, being recently or partially established, do not at present supply the demand for domestic use and consumption; but which, with proper cultivation, are capable of being matured to the whole extent of the demand. These embraced cotton goods of the coarser kinds; woolen goods of the coarser kinds generally, and some of the finer kinds; metal buttons, plated wares, iron manufactures of the larger kinds, shovels, spades, axes, hoes, scythes, etc., nails large and small; pewter, tin, copper and brass manufactures; alum, copperas; spirits, beer, ale, and porter.

Third.—Manufactures which were so slightly cultivated, as to leave the demand of the country wholly, or almost wholly, dependent upon foreign sources for a supply. These comprised cotton manufactures of the finer kinds, muslins, nankeens, chintzes, stained and printed cottons of all descriptions; linen of all descriptions, linen cambrics, lawns; hempen cloths, sail cloth, Russian and German linens; silk goods of all descriptions; woolen goods of many descriptions, worsted goods of all kinds, stuffs, camblets, blankets, carpets, and carpeting; hosiery of all descriptions, including knit or woven gloves; hardware and iron-mongery, excepting the large articles, cutlery, pins and needles; china ware, earthenware, porcelain; glass of all descriptions except window glass and phials.

Duties amounting, wholly or nearly, to a prohibition of similar articles imported, it was conceived might be laid upon the first class, and a well directed legislative patronage would not only preserve the second class, but speedily raise them to the condition of the first class. The cost to the consumer would, in the first case, be kept down by competition, and in the second would not be necessarily increased. The inconvenience would be but temporary, while the future advantages to the nation would be great, and particularly to the agriculturist, who would thereby find a ready market in his own neighborhood for his cotton, wool, and produce.

Upon the third class, the rate of duty could be adjusted simply with reference to revenue.

The tariff of duties proposed by Mr. Dallas, in accordance with these general principles, was from ten to thirty-three and one-third, and in one case forty per cent. higher on all the principal articles of manufacture, forty-four in number, than the rates finally adopted. On cotton goods, which by the old tariff paid twelve and a half per cent., Mr. Dallas proposed thirty-three and a half, which was reduced to twenty-five per cent. On china, pottery, glass (other than window), it was reduced from thirty to twenty per cent., and hammered bar and bolt iron from seventy-five cents to forty-five cents per hundredweight.

On the same day that the Secretary's report was sent in, Mr. Newton, of Virginia, from the Committee of Commerce and Manufactures, to whom had been referred the memorials of the manufacturers of cotton wool, also made a report, from which we have presented, on a previous page, some statistics of that industry.

It stated the consumption of cotton to have increased from five hundred bales, in the year 1800, to ninety thousand bales in 1815, the capital employed to amount to forty millions of dollars, and the value of the product to be twenty-four millions.[1] An increase of the duties on imports was urged in a lengthy and forcible argument, in favor of the general policy of protection to manufactures.

"The American manufacturers," say the committee, "have good reasons for their apprehensions—they have much at stake. They have a large capital employed and are feelingly alive for its fate. Should the National Government not afford them protection, the dangers which invest and threaten them will destroy all their hopes, and will close their prospects of utility to their country. A reasonable encouragement will sustain and keep them erect; but, if they fall, they fall never to rise again.

"The foreign manufacturers and merchants know this; and will redouble with renovated zeal the stroke to prostrate them. They also know, that should the American manufacturing establishments fall, their mouldering piles—the visible ruins of a legislative breath—will warm all who shall tread in the same footsteps of their doom, the inevitable destiny of their establishments. . . . Do not the suggestions of wisdom plainly show, that the security, the peace, and the happiness of the nation, depend on opening and enlarging all our resources, and drawing from them whatever shall be required for public use or private accomodation? The Committee, from the views which they have taken, consider the situation of manufacturing establishments to be perilous. Some have deceased and others have suspended business. A liberal encouragement will put them again into operation with increased powers; but should it be withheld they will be prostrated. Thousands will be reduced to want and wretchedness. A capital of near sixty millions of dollars will become inactive, the greater part of which will be a dead loss to the manufacturers.]Our improvi-

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(1) In reference to the remarkable growth of the cotton manufacture as developed in this report, a very intelligent writer in Edinburg, is said to have used the following language: "The great extent of the cotton manufacture in the United States, stated in the preceding report, is more like what the sanguine views of the parties had contemplated than what had been actually achieved. Indeed it would have been impossible, even in a country with an extensive population and established manufacturing habits, to have reared, in the time, a manufacture of the magnitude they mention. But whatever prosperity it had attained, was put an end to by the restoration of peace with England, and this notwithstanding the heavy tax levied on foreign cotton goods. That the failure of those attempts, however, was not occasioned by any defect in the plan or general conduct of the establishments, we know from a gentleman who visited the principal cotton works in America, in 1816. He found the machinery in many of them of excellent construction, and those who had the charge of them were men who had been bred in this country, and who were possessed of both skill and judgment. But the circumstances in the state of America which we have mentioned, were so adverse to the nature of the undertaking as to render success in the opinion of those persons impossible."

dence may lead to fatal consequences. The Powers jealous of our growth and prosperity will acquire the resources and strength which this Government neglects to improve."

A duty of at least ten cents on the square yard, was considered by the Committee necessary to protect the American cotton manufacture, and an ad valorem duty of even forty or fifty per cent. on India goods, on account of the lowness of their first cost, would not give the requisite encouragement.

With the machinery already erected, including at least 500,000 spindles, the cotton manufacturers could supply the United States with about ninety million yards of cloth annually. These consisted chiefly of ginghams, plaids, bed-ticks, stripes, checks, sheetings, shirtings, and in part of canvas and velvets, and other cut stuffs. The shirtings made from yarn No. 12 would then bring twenty-three cents in New York, at which price they could not be afforded; the same article had been sold for thirty-three to thirty-five cents. Of the spindles then in operation, very few were effectually at work before the war. Such establishments had as yet reaped no profit whatever. There was one manufactory of cut fustians and velvets at Hudson, and one about to begin at Frankfort, and these goods required a duty higher than was proposed for other goods. They cost more—say from fourteen pence to thirty pence per yard, of eighteen inches width—and therefore required a duty of thirty cents per square yard, for such as cost twenty-three pence and under, and thirty-six cents for such as cost more.

The same Committee, on 6th March, reported on the memorials and petitions of the woolen manufacturers. This branch employed a capital of twelve millions of dollars, and one hundred thousand hands, producing goods to the value of nineteen millions of dollars. Every reason urged in the foregoing report, for sustaining the cotton manufacture, applied with equal force to this, and the Committee felt bound to accord the same justice to the manufacturers of wool.[1]

With these principles and objects before it, and at the earnest solicitation of numerous memorialists, Congress, on the 20th February, for the first time addressed itself to the consideration of a tariff bill, reported by

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(1) Messrs. Arthur W. Magill and Wm. Young, whose estimates were accepted by the Committee, stated, in a letter to the chairman, that the manufacture of woolen cloths, in Connecticut alone, then employed twenty-five establishments, and 1,200 persons, besides as many more hands indirectly. Their capital was $450,000, and they probably made 75,000 yards of narrow, and 25,000 yards of broadcloths. As many as 500,000 yards were supposed to be made annually in families. The manufacture was capable of an increase, throughout the Union, of twenty-five to thirty per cent. per annum.

Mr. Lowndes, of South Carolina, Chairman of the Committee of Ways and Means, with a primary view to the encouragement of domestic manufactures, those of cotton and wool being prominent objects of regard.

In this bill, embracing the schedule reported by Mr. Dallas, the *minimum* principle, as applied to certain foreign goods, was first adopted in connection with low-priced cottons. Its object was virtually to exclude the coarse, low-priced India cottons, then imported in large quantities, alike to the prejudice of the American manufacturer and cotton grower. The introduction of the minimum valuation has been ascribed to Mr. F. C. Lowell, of Massachusetts, who secured for it the advocacy of Messrs. Lowndes and J. C. Calhoun; and those gentlemen, with other representatives from South Carolina and the Southern States, were, during the discussion of the bill, among the ablest supporters of the principle of protection, apparently without any suspicion of the unconstitutionality of the measure, which was afterward discovered in that quarter. There was a difference of opinion as to the degree of protection required, or that was proper to be granted through the tariff; but a general concurrence in the propriety and necessity of the measure at that particular crisis. Many regarded the faith of the Government as involved in the support of manufactures, created by its restrictive measures and the war, and which had, to so great an extent, been the dependence of the country during that period. A portion of the commercial and landed interests, which had suffered from the causes that created and sustained manufactures, now felt themselves entitled to be relieved from all unnecessary burthens in support of an industry which had thriven during their embarrassments. They were disposed to limit the duties to such rates and duration as was compatible with the object which all were disposed to cherish. Mr. Clay, to try the sense of the House as to the extent to which it was willing to go in protecting domestic manufactures, moved to amend the bill by increasing the duty on imported cottons from twenty-five to thirty-three and one-third per cent.—afterward reduced to thirty—and advocated a thorough and decided protection by ample duties, as did also Mr. Ingham, of Pennsylvania, who stated that not less than one hundred millions were believed to have been invested in manufactures within the last eight or ten years; all of which was endangered by the accumulated amount, cheapened cost, and improved quality of foreign manufactures. The commercial interests were well defended by Mr. Smith, of Maryland, and Daniel Webster, then a representative from New Hampshire, both of whom favored moderate protection. Mr. Webster, who considered permanency, rather than a high duty, desirable, proposed a maximum duty on cottons of thirty per cent., to be reduced after two years to twenty-five, and in two more to twenty per cent. He endeavored to avert the sudden destruction of the India trade, which was stated to employ forty ships, capable of carrying one thousand bales, of eighteen hundred yards each, or a total of seventy-two million yards of cloth, worth nearly six and a half millions of dollars, which value, with the eighteen million pounds of cotton consumed in its manufacture, was so much taken from the industry of the United States. Under the minimum provision of the bill, by which cotton cloths (except nankeens from China), the original cost of which, at the place whence imported, was less than twenty-five cents the square yard, were to be deemed to have cost twenty-five cents, and to pay duty accordingly, the trade in India cottons was intended to be arrested. Mr. Pickering, of Massachusetts, who did not believe the existing manufactures required a duty of twenty-five per cent., for two years, moved in Committee of the Whole to strike out that clause, but found few supporters. Afterward, before the House, he moved to amend it by a return to the old double duties, and during the discussion, Mr. Randolph, who was disposed to encourage none but household or family manufactures, again moved to strike out the minimum proviso. This drew from Mr. Calhoun an earnest defence of the principle of protection, upon grounds of prudence and national policy, as well as of justice to manufacturers, which had originated in the public necessity of the times. The bill was then carried by a vote of eighty-eight to fifty-four, and was approved on the 27th. Mr. Wright, of Maryland, proposed to exclude the votes of members interested in cotton manufactures. The duty on woolen manufactures, except blankets, rugs, and worsted or stuff goods, was fixed at twenty-five per cent. ad valorem for three years, from 30th June, and on cotton cloths, twist yarn, or thread, at twenty-five per cent., for the same time, after which, cottons were to pay twenty per cent. ad valorem. The minimum valuation of cotton cloths was, in effect, a specific duty of six and a quarter cents a yard, and was also applied to unbleached and uncolored cotton, twist yarn or thread, costing less than sixty cents a pound, and to bleached or colored yarn, costing less than seventy-five cents per pound.

By this act a discrimination was first made between hammered and rolled bar iron, which, under the permanent duties, had paid alike fifteen per cent., and double rates during the war. On hammered iron, chiefly made in Russia and Sweden, a duty of seventy-five cents per cwt. was proposed, but was reduced, on motion of Mr. Webster, to forty-five cents, or nine dollars per ton, equivalent to about thirteen per cent. upon its first cost.[1] On rolled iron, which was made in England, by the new and cheaper process, at about half the price of the former, the duty was one dollar and fifty cents per cwt., or thirty dollars per ton, equal to about eighty-five per cent. on its cost. This difference was the subject of remonstrance by Great Britain, as a departure from the provisions of the Convention of July 3, 1815.

The principal foreign manufactures and products were admitted at the following ad valorem rates, calculated on the net cost at the place whence imported, exclusive of packages, commissions, and exchanges, with the usual twenty and ten per cent. additional, viz:

At seven and a half per cent., ad valorem, saltpetre, jewelry, watches, gold and silver wares, laces, etc.; at fifteen per cent., gold leaf, and articles otherwise free; at twenty per cent., hempen, or sail cloth (except Russia, German, and Holland linen and duck), cotton and wool stockings, types, brass, copper, iron, steel, pewter, lead and tin wares, brass wire, cutlery, pins, needles, buttons and moulds, buckles, gilt, plated and japanned wares, cannon, muskets, fire and side arms, Prussian blue, china, earthen, stone and porcelain wares, glass, other than window, and black quart bottles; at twenty-five per cent., cotton and woolen goods; at thirty per cent., umbrellas, parasols, and parts thereof, bonnets and caps, artificial flowers and millinery, hats and caps of all kinds, painted floor cloths, mats, salad oil, mustard, pickles, sweetmeats, wafers, cabinet wares, and all manufactures of wood, carriages and parts thereof, leather and manufactures of leather, paper, pasteboard, paper hangings, blank books, parchment vellum, brushes, canes, whips, and ready made clothing.

The following specific duties were laid, viz: on ale, beer, and porter bottled, fifteen cents, unbottled, ten cents a gallon; alum and copperas, one dollar a cwt.; black glass bottles, one dollar and forty-four cents per gross; window glass from eight by ten and under to ten by twelve in size, one dollar and fifty cents to three dollars and twenty-five cents per hundred square feet; boots, one dollar and fifty cents; shoes and slippers of silk, thirty cents, of leather, twenty-five cents, childrens', fifteen cents per pair; tallow, whiting, and Paris white, ochre dry (in oil one and a half cents); lead in pigs, bars, or sheets, one cent; spikes, shot of lead, two cents; bristles, tarred cordage and cables, tallow candles, cotton, chocolate, red and white lead, nails, soap, brown sugar, etc., three

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(1) The excise collected upon iron made in all the states, between 18th April, 1815, and the 22d February, 1816, amounted to $61,903, of which Pennsylvania paid $27,941, showing that state to have made nearly as much iron as all the others. Yet two representatives from that state voted for a reduction of the duty, while Messrs. Calhoun and Maynard, from South Carolina, voted for the higher rate.

cents; white clayed or powdered sugar, untarred cordage, yarns, twines, packthread and sieves, copper and composition rods, bolts, spikes or nails, four cents; coffee, glue, iron or steel wire, not exceeding No. 18, five cents; wire over No. 18, nine cents; wax and spermaceti candles, six cents; gunpowder, eight cents; cheese, nine cents; lump sugar and manufactured tobacco, ten cents; loaf sugar, sugar candy, and snuff, twelve cents; indigo, fifteen cents a pound; coal, five cents the heaped bushel; salt, twenty cents a bushel; spirits from grain, forty-two to seventy-five cents, and from other materials, thirty-eight to seventy cents, according to proof; molasses, five cents; wines twenty-five cents to one dollar a gallon; anchors, rolled bar, and bolt iron, one dollar and fifty cents, hammered iron, forty-five cents, iron in sheets, rods, and hoops, two dollars and fifty cents per cwt.; Russian duck, two dollars, ravens, one dollar and twenty-five cents, Holland, two dollars and fifty cents per piece; segars, two dollars and fifty cents per thousand; teas, twelve to sixty-eight cents per pound; olive and spermaceti oils, twenty-five cents, whale and other fish oils, fifteen cents a gallon.

This tariff, though falling far short of the measure of protection, which the more ardent friends of manufactures felt themselves entitled to, was accepted as an advance upon the permanent duties to which they were about to return. Although, upon the whole, as much calculated to benefit the farming and planting interests, which had opposed it, as the manufacturing, it doubtless averted the speedy ruin, which would otherwise have overtaken several branches, and probably destroyed the cotton manufacture altogether. The benefits expected from it increased very greatly, however, the competition in manufactures, and with the decline in prices that soon followed, as a result of improved machinery, and increased enterprise abroad, and the resumption of specie payments, brought the severest distress upon the manufacturing classes.

The immediate effect of its operation upon the accumulated supplies of foreign manufactures, which began to flood the country after the peace, was to replenish the public treasury, of which the receipts from customs during the year amounted to $36,306,874, or seventy-three per cent. above the estimate, and more than double the maximum before the embargo, when it reached $16,363,550, in 1807. The total amount of ad valorem duties, at twenty-five per cent., chiefly on cottons and woolens, paid in 1815 and 1816, was $28,826,419. The foreign imports retained for consumption were double the value of domestic exports, which were greater than that of any previous year, by nearly fifty per cent. The total imports exceeded one hundred and forty-seven millions in value.

Financial embarrassment to importers and manufacturers was the inevitable consequence, and was only partially alleviated by the operations of the new United States Bank, created with a view to restore the currency. That institution was chartered on the 10th April, for twenty years, and was opened early in the ensuing year, with a capital of thirty-five millions (of which seven millions were held by the United States), in shares of one hundred dollars, bearing five per cent. interest, with twenty-five branches in the different states. The resumption of specie payments was thereby forced upon the other banks, and a general improvement of the currency resulted, although the sudden curtailment of their heavy issues produced much commercial distress during a few subsequent years. The Bank of England, which had not paid specie since 1797, also partially resumed, in December, by paying specie for one and two pound notes. The greatest distress, however, prevailed in England as a consequence of the general peace in Europe, which was more immediately disastrous to her than to the United States. Riots, and the destruction of machinery, were particularly rife throughout this year.

As a means of alleviating the present and prospective distress of the laboring classes, arising out of the instability of manufactures, the first savings institutions in this country were organized toward the close of this year. The "Saving Fund Society," of Philadelphia, Andrew Bayard, President, was opened for business December 2d, and the "Provident Institution for Savings," at Boston, was incorporated on the 13th. The latter, "intended to encourage industry and prudence in the poorer classes, and to induce them to save and lay by something of their earnings for a period of life when they will be less able to earn a support," received deposits as low as one dollar, and paid interest when they amounted to five dollars. The "Bank of Savings," in the city of New York, was formed under the auspices of the Society for the Prevention of Pauperism, in public meeting on 25th November. It was incorporated in March 1819, and received its first deposits, to the amount of $2,807, from eighty depositors, in sums of two dollars to three hundred dollars, on 3d July following.[1]

The dangers which appeared to threaten the national industry induced the American Society for the Encouragement of Domestic Manufactures, to issue at New York, on 31st December, an address to the people of the United States, inviting them promptly to establish throughout the Union, Societies for correspondence with them and with each other,

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(1) On the 1st January, 1859, there were fifty-seven Savings Banks in the state, and sixteen in the city of New York; the latter having on deposit $36,804,419, and resources to the value of $38,757,860. The first Savings Bank in Baltimore, was formed early in 1818, and incorporated at the next session of the Assembly. It received, during the next three years, deposits to the amount of nearly $80,000.

and upon manufacturers, agriculturists, merchants, men of science, soldiers, and women every where to unite in upbuilding American Manufactures.

The Columbian Institute, for the promotion of Arts and Sciences, was instituted this year at Washington. It was merged in the National Institute on the expiration of its charter in 1830.

An interesting event of this year, was the introduction, in several different places, of the system of illumination by Gas Light. Lewis Enters and William Zeigler, of Georgetown, D. C., in February, memoralized Congress for its aid and patronage in carrying into execution a discovery which they had lately made of producing light from the gas of stone coal, for which they had already received a patent. In Baltimore a company was formed, composed of Rembrandt Peale, Wm. Lorman, James Mosher, Robert C. Levy, and Wm. Gwynn, who obtained a charter to furnish the city and individuals with gas light. They erected works on the south-west corner of North and Saratoga streets, and were the first in the United States to carry into operation the improved mode of illuminating towns. The corporation of New York, also, during the year, took measures for introducing gas light. Gas was introduced into a mill near Cincinnati, by Mr. William Green, and it was also proposed to light the streets of the city with it. On the 25th November, the New Theatre at Philadelphia was illuminated with gas lights under the direction of Dr. Kugler, being the first theatre on the continent illuminated in that manner.

A proposition was also made this year by Dr. John Rodman Coxe, professor of chemistry in the University of Pennsylvania, to establish an Electric Telegraph and to make signals at a distance by the decomposition of water and metallic salts, whereby a change of color would be produced.[1]

The manufacture of chemicals, paints, medicines, etc., was commenced at Baltimore, by Messrs. Howard Sims and Isaac Tyson, who erected a laboratory on Pratt street. They afterward removed it to Washington Avenue, and were incorporated in 1822. They became extensive manufacturers of copperas, and of chromate of potash, chrome yellow, and other chromic pigments from the chromate of iron at Bare Hills, Maryland, and in Chester County, Pennsylvania.

The first Steam Paper mill in the United States, went into operation at Pittsburg, with an engine of sixteen horse power, on the principle of Evans's. It employed forty persons, and consumed ten thousand bushels

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(1) Thompson's Annals of Philosophy, vol. 7, p. 162.

of coal, and one hundred and twenty thousand pounds of rags, and made $30,000 worth of paper annually.

Five steamboats were built this year on the western rivers, of which the Vesta, one hundred tons, was the first ever built at Cincinnati. A small boat was built at Hendersonville, Ky. The Washington, of four hundred tons, constructed at Wheeling, with an engine made at Brownsville, was the first boat with her boilers above deck instead of in the hold, and was also the first to prove, by making a round trip from Louisville to New Orleans and back in forty-five days, the fitness of steamboats for the ascending trade. The increase of steamboats from this time was rapid. Shipbuilding was revived at Marietta, by the formation, in March, of a large commercial and exporting company at that place.

The first steamboat on Lake Ontario, was built this year at Sackett's Harbor. She was named the "Ontario," and made her first trip in April of the ensuing year.

Commercial intercourse with Europe was greatly facilitated by the commencement this year of the first line of Packet ships. Three ships of three hundred to four hundred tons, to sail on stated days about once a month, were put on the route by Jeremiah Thompson and Isaac Wright, and others.

By an act of Congress of 25th April, Congress appropriated one million dollars annually for eight years, for the general increase of the navy. Nine ships of not less than seventy-four guns each, and twelve of forty-four guns, including one seventy-four and three forty-four gun ships previously ordered, were to be built, and the engines and imperishable materials for three steam batteries were to be purchased. Under this act large contracts were made for timber and other materials, including 2,300 bolts of *American* canvas for about $49,700; eighty tons of lead for $10,398; 500 tons of iron for $52,558, and a steam engine of one hundred horse-power for $30,000. The Washington, of two thousand tons, one of the seventy-four gun ships referred to, was built at Portsmouth, N. H., and was the first United States ship of the line ever launched. She sailed May 8th, from Boston, under Commodore Chauncey, for Annapolis, to take out Mr. Pinckney as ambassador to Naples.

The manufacture of Cotton Sail Duck, commenced in 1809 by Mr. Bemis, near Boston, had been greatly increased on account of the scarcity of foreign sail cloth, and the amount required for privateers and merchant vessels, which raised the price of No. 1 duck to nearly one dollar a yard. It was made of Sea Island Cotton, costing then twenty to twenty-five cents a pound. During the first year of the war the manufacturers' sales were increased in Boston, and the article introduced to the southern markets; the article after 1812 being transported to

Baltimore, Alexandria, and Richmond, on his own teams, which, after an expedition of several months, returned with flour, tobacco, and other southern products; in 1812–13 his sales in Baltimore, by one house, were about $20,000; and by another, in the last and present year, over $21,000. He adopted this year the use of the Power Loom, which, with other improvements, reduced the price in the next fifteen years to thirty-five cents a yard, the manufacture having been commenced by others in the mean time.[1]

The encouragement given to woolen manufacturers by the tariff of this year, in which they were mentioned for the first time, prompted new enterprises in that branch. In addition to the Maryland Soap and Candle Factory, on a large scale, and the Warren Cotton Factory at Great Gunpowder Falls, incorporated this year in Maryland, an extensive woolen factory went into operation near Baltimore, and another at the Little Falls of the Potomac. In Ohio and neighboring parts of the west, where an improved quality of wool was now produced, woolen factories were increasing. At Steubenville, Ohio, a steam woolen factory, in addition to cotton, paper, and other factories, was in operation, owned by B. Wells & Co., and another large woolen mill, established by Thomas Roach, near Kendall, in Stark County.[2]

A new American Power Loom, to be worked by steam or water-power was invented and put in operation in Boston, this year, by Mr. E. Savage. It was of simple construction, and was adapted for weaving woolen cloths three yards wide, and the largest cotton sheets without a seam, fine shirtings, etc.

A patent was granted July 25th, to Cyrus Shepherd and J. Thorpe, of Taunton, Mass., for an upright power loom which was already in operation in the woolen mill of Mr. Shepherd, at that place. The same parties were also granted, October 14, a patent for a socket bobbin-winder, which was considered the best winding machine in use. It is related by the late Mr. Appleton, that while bargaining with Mr. Shepherd for the right of using the winders on a large scale, it occurred to Mr. Lowell or Mr. Moody, of the Waltham Factory, that he could spin the cops direct upon the bobbin, which cut short the negotiation and resulted in the last great improvement in connection with the power loom, that of spinning the filling directly on the cops without the process of winding. Mr. Moody took a patent (March 9) for winding spool yarn.

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(1) Third Annual Report of Boston Board of Trade for 1857.

(2) At Richard Brown's woolen factory, Hollidays Cove, Va., four miles from Steubenville, the wool was shorn from a sheep in the morning, washed, carded, and spun into yarn of eighteen outs to the pound, wove, dyed, filled, dried, shorn and made into a coat and worn in the space of twenty-four hours.

Jeptha A. Wilkinson, of Otsego, N. Y., patented (July 3) a machine for making loom reeds. This valuable machine, invented in 1813, was first successfully put in operation in the manufactory of Sharp, Roberts & Co., Dean's Gate, Manchester, England. In 1823, the inventor returned and established a manufactory of reeds in Providence, R. I., which, with the machine, he sold the same year to Arnold Wilkinson, by whom the machine was much improved. The factory has been since owned and much extended by Gorham & Angell, W. S. Humphreys & Co., and Frederick Miller, the present or recent owner.

Patents were taken out by Jos. and Stinson Demund, N. J. (Jan. 17), for making ardent spirits from corn and corn cobs; Daniel French, Bridgeport, Pa. (April 23), turning buttons; John Morton, Southington, Ct. (June 13), wooden mould buttons; Joseph Derby, Worcester, Mass. (April 30), stamping engravings on horn, etc.; Hez. Kelby, Brooklyn, N. Y. (May 17), extracting turpentine by steam; Nathan Weston, Reading, Mass. (May 24), cemented hats; David Beard, Guilford, N. C. (May 28), blocking hats; Eli Terry, Litchfield, Conn. (June 12), thirty-hour wooden clocks; Jesse Reed, Hanover, Mass. (August 1), making tacks. The inventor, a son of Ezekiel Reed, for whom the invention of cut nails and tacks has been claimed, had, at this time, six machines in operation at Pembroke, with one of which a single hand had made 60,000 in a day. Six others then building, were sold, with the right, to Elisha Hobart, of Abington, for $11,000. They completed the tack at one operation. George Ellicott, Baltimore (Sept. 20), rolling bar iron edgeways; David Thacher, Tuckerton, N. J. (Oct. 24), plan for erecting salt works; Benjamin Hanks, Albany, N. Y. (Nov. 4), moulding and casting bells; Peter L. Lannay, Baltimore (Dec. 4), elastic water-proof leather; John Adamson, Boston (Dec. 13), floating dry docks. This patent was renewed by act of Congress, March 3, 1831; Jacob Perkins and Thomas Gilpin, Philadelphia (Dec. 18), water marks in paper, and Thomas Gilpin (Dec. 24), making paper. This patent was for the first cylinder machine made or operated in this country. The patentee, who, in addition to extensive paper manufactures, had, during the war, erected large cotton and woolen factories on the Brandywine, after the peace, resolved to suspend the cotton works and to increase his paper manufacture. By the aid of all published drawings and works on the subject, and much skill in drawing as well as mathematical, mechanical and other scientific knowledge, he constructed a machine differing somewhat from those in use in Europe, and in February of the ensuing year, Poulson's "Daily Advertiser," in Philadelphia, was printed on paper cut from a continuous sheet made on his machine. A new edition of Lavoisne's Historical and Genealogical Atlas, was about two years after put to press by M. Carey & Sons, on paper made on his machines; and samples (one of them writing paper of superior quality) taken from a sheet 1,000 feet long and twenty-seven inches wide, were deposited by the Messrs. Gilpins with the American Philosophical Society in Philadelphia. The machine did the work of ten paper vats.

1817 The dangers which had for some time been seen by prudent men to overhang the business of the country from an inflated and depreciated paper currency and other monetary causes, but especially from the enormous importations of foreign manufactures, began already to weigh heavily upon the manufacturing and laboring classes. By a resolution of Congress, paper money was not receivable for government dues after 20th February of this year, on which day the New York branch of the United States Bank went into full operation. On the same day the other banks of New York, Philadelphia, Trenton, Baltimore, and Richmond recommenced paying specie, and were followed, on 20th March, by the Bank of Pittsburg and by other private banks in the Middle, Western, and Southern States. The amount of paper in circulation was little reduced, however, nor had the banking mania been abated. When it reached its height in the following spring, about two hundred local banks had been projected in different parts of the Union. The drain of specie, to pay the heavy balance against the country for imports, continued to embarrass trade and soon forced the banks to contract, and many of them to break, involving an immense depreciation of property and entailing bankruptcy upon many individuals and companies.

The distress of the manufacturers—many of whom, particularly the cotton manufacturers of Rhode Island and other parts of New England, had, during the last year, entirely suspended operations—was made known, during the second session of the fourteenth Congress, by upward of forty memorials from ten different states, presented to that body between the 16th December and the 28th February. Of these petitions, twenty-two were upon the subject of bar iron and iron manufactures, principally in New York, New Jersey, and Pennsylvania, with several from Connecticut, Boston, Kentucky, and Vermont.

The cotton and woolen manufacturers of Rhode Island and Connecticut, and the umbrella manufacturers of Massachusetts and New York, and the lead manufacturers of Illinois, each sent a memorial. Others were presented on the subject of manufactures generally, viz.: two from Berkshire, Mass., five from New York, two from Oneida county, and one each from New Jersey, Pittsburg, Baltimore, and Philadelphia.

These memorials, to which were attached names of the highest respectability, though forcible in argument and pathetic in their appeals, and in many instances supported by agents at Washington, were all referred, without reading, to the Committee on Commerce and Manufactures, and few of them were ever reported upon. The Pittsburg memorial placed the prostrate condition of manufactures, resulting from unlimited importations and the inadequacy of the tariff, in a strong light, and was printed for the use of members.

The Oneida (N. Y.) memorialists stated, that that county contained a greater number of cotton and woolen manufactories than any in the state, and that $600,000 was invested in them. In spite of the utmost efforts of their proprietors, more than three-fourths of them remained closed, some of their owners having been wholly ruined and others struggling under the greatest embarrassments. They could not believe that the Legislature of the Union "would remain an indifferent spectator of the wide-spread ruin of their fellow citizens, and look on and see a great branch of industry, of the utmost importance in every community, prostrated under circumstances fatal to all future attempts at revival, without a farther effort for relief."

The distress exhibited in these memorials was common to the manufacturing portions of the Union. The representations of the memorialists, numbering many thousands, met with little more attention from the Senate than the House. Permission was successively granted them, on motion of a member of the committee to whom they were referred, to "withdraw their papers." A bill for the relief of the iron masters was, however, reported in February, but was never called up for a third reading.

The farming, planting, and shipping interests were as yet exempt from these embarrassments, in consequence of the failure of two successive corn crops in Europe, and the increased demand for cotton upon the resumption of manufactures after the general peace. Cotton, which had been down to twelve cents a pound, sold, during the last and present years, for about twenty-seven cents a pound. Flour rose from $9.50 a barrel in 1814, to $12.50 in 1816, and to fourteen dollars in February of the present year, in Philadelphia, and was exported to the value of $17,750,000. The price of tobacco also increased from seventy-four dollars per hogshead in 1814 to $185 in 1816, and an exportation of 62,365 hogsheads during the present year averaged $148. The agriculturists, particularly of the South, were greatly enriched by their crops. Although they enjoyed, under the recent tariff, that ample protection which they were reluctant to grant the manufacturers, their own prosperity was not of long continuance, and they soon experienced the value of a home market for their produce.

The measures which principally affected the agricultural classes, were the exclusion of American flour from British ports after November of this year, and the increased importations into that country of raw cotton from India, under the stimulus of high prices, induced by the rapid increase of the manufacture, which impaired the profits of the American planter. The importation of India cotton into England, had increased from 8,535 bags in 1802 to 117,454 bags in this year, and reached 247,604 in the next. The imports of cotton from America in 1802, were 107,494 bags, and this year 198,917, and in the next year was 205,881. The cotton from Brazil had more than trebled in the same time, and in the next five years American Uplands declined in price to nine and ten pence a pound.

The importance of fostering domestic manufactures as a support to the agriculture of the country, and as a national object, was referred to in the first inaugural address of President Monroe, as well as on subsequent occasions during his administration. They required the "systematic and fostering care of the government," and we ought not to be dependent upon other countries for supplies or capital, having abundant raw materials that would be enhanced in value by creating a domestic market. //

Following the example of his predecessor, the President wore on this occasion, a suit of American cloth from a Pawtucket manufactory. Four fifths of the Legislature of Connecticut, were also, at this time, clothed in domestic fabrics; and at the close of its session, that body, by resolution, recommended the use of American fabrics by the people of the state, and declared the extension of cotton and woolen establishments to be connected with the best interests of the state. A joint committee of the New York Legislature, reported that the manufacturing policy of Great Britain was exclusive and calculated to crush American manufactures, involving immense suffering to the poor. It was resolved to move Congress to grant support and protection, and all officials of the government were recommended to wear home manufactures.

Among the acts of the National Legislature at this session, was one approved March 1st, which was the first bearing properly the character of a Navigation act, limiting importations to the vessels of the country in which the goods were produced, restricting the bounty to fishing vessels to crews of the United States, and excluding all but American vessels from the coasting trade.

A discriminating tonnage duty, of two dollars per ton, was also laid on 3d March, and, as a countervailing measure, the importation of plaster of Paris from Nova Scotia, was prohibited.

Four townships, each six miles square (92,160 acres), of vacant public land in Alabama—now Green and Marengo counties—were granted to Charles Villar and his associates, to encourage the cultivation of the vine and olive by French emigrants, who, ten years later, had 271 acres under cultivation with vines, and about 388 olive trees. The experiment did not, however, succeed.

In aid of efforts made to sustain manufactures, the "Delaware Society for promoting American Manufactures," was established at Wilmington, February 15, and the "Pennsylvania Society for the Promotion of Public Economy," at Philadelphia, May 13. The Delaware Society soon after issued a circular, calling for such statistics and observations upon practical economy as, aided by the voice of the people, might influence Congress in favor of American industry.

About the same time, the Philadelphia Society for the Promotion of National Industry, composed of ten influential members, was formed in that city. Its object was to advocate the protection of national industry in general, but more particularly for manufactures perishing for want of protection. It exerted considerable influence upon the public mind during the next few years, chiefly through a series of published addresses, most of them from the pen of Matthew Carey, who, in this connection, first appeared as the ardent and uncompromising advocate of protection, and for several years labored in behalf of the manufacturer with a zeal and a disinterestedness seldom equalled. These societies, the "Metropolitan Society" of Washington, Georgetown, and Alexandria, and others with similar objects in Baltimore, Lancaster, Rome and other places in New York, Middletown, Hartford, Litchfield, and elsewhere in New England, New Jersey, and the Western States, were organized early in this year, mainly through the efforts of the American Society for the Encouragement of American Manufactures, in New York, of which D. D. Tomkins, Vice President of United States, was president. It had published and circulated five thousand copies of an address to the people, and sent delegates to Washington, who held meetings in different places to excite a general interest in the subject. On 11th July, the American Society held a meeting and elected President Monroe, and Messrs. Adams and Jefferson, members of the Society, and were honored with the attendance of the President, then returning from a tour to the East, who commended highly the objects of the Society.

In April, the General Manufacturing Law of the State of New York, was so amended, chiefly through the agency of Gideon Lee, as to enable the manufacturers of Morocco and other Leather to become incorporated under the act, with capitals not exceeding $60,000, to be located only in Greene and Delaware counties.

Under this law, the "New York Tannery" was organized in May, by an enterprising company, and under the superintendence of William Edwards and Son, a tannery calculated for five thousand hides—the first wholly under cover in the United States—was erected at Hunter, in Greene County, on the Schoharie kill, twenty miles west of the Hudson, and in the midst of the hemlock forests of the Catskill Mountains, having twelve hundred acres of land attached. The first leather was sent to market from this region in the autumn of the next year. In 1822, the Messrs. Edwards, aided by Jacob Lorillard, whose name is associated with those of Edwards, Lee and Pratt, as one of the founders of the leather trade in the United States, purchased the real estate of the Company, which had been unsuccessful, and greatly enlarged the business and added new improvements in machinery. Other large tanneries had been erected in the mean time, and thenceforward the Catskill region became the principal source of leather for the New York market, previously supplied with hemlock leather from Connecticut, Massachusetts, and Vermont, and with oak-tanned leather from the Middle States of the Union.

On the 15th April, the Legislature of New York passed an act of the highest importance, creating a fund for the construction of the Erie, Champlain and Hudson Canal, the commencement of its stupendous system of internal improvements. A report of the commissioners, under an act of the previous year, estimated the cost at $5,752,738, but the actual cost amounted to $8,401,394. The judicious system of finance embodied in the act, and in the main embraced in the celebrated memorial drawn up by De Witt Clinton, and presented with more than one hundred thousand signatures to the Legislature, in 1816, included a duty on goods sold at auction, and raised the duty on salt made in the state from three to twelve and a half cents a bushel, pledging the revenues from these sources for the payment of the canal debt, which was effected in about nineteen years. Ground was first broken for this great work, at Rome, on the 4th July, and it was completed on 26th October, 1825.

The United States Salines, twenty-six miles below the mouth of the Wabash, recently leased by government to Messrs. Wilkins & Morrison, of Lexington, yielded at this time, about three hundred thousand bushels annually, and supplied the settlements of Illinois and Indiana at from fifty to seventy-five cents a bushel. Some beds of rock salt had been lately discovered on a fork of the Canadian, one of the head waters of the Arkansas river, between the latter and the Red river. Postlethwaites, and some other salt works on the Sabine and Red rivers, furnished that part of the country with salt at one to two dollars a barrel, from salt springs. Considerable salt was made at various salines throughout the west, but those of Kentucky and upon the Conemaugh and Kenhawa were by far the most productive.

Eight steamboats were built, this year, on the western rivers. On the 2d August, the General Pike, Captain Jacob Reed, a low pressure boat, built at Louisville, arrived at St. Louis, being the first that ever ascended the Mississippi to that placce. The first steamboat or vessel of any kind ever built in Alabama, was this year constructed at St. Stephens, by Messrs. Brown & Bell, natives of Darien, Conn., who had learned the business in New York, to which city they returned, in 1819, to conductfor many years an extensive business, in the ship-yard of their former employers, at the foot of Stanton street.

A manufactory of steam and fire engines, mill machinery, brass and copper castings, etc., but chiefly of engines for steamboats, was established in Cincinnati. It employed two air and one cupola furnace, fifteen smith's forges, with the requisite machinery, one hundred men, and a capital of $80,000, and manufactured products to the market value of $130,000, but was compelled entirely to suspend operations during the pressure of 1820–21. Another machine factory, established the next year, suffered great depression from the same cause; as did also manufacturers of brass-work, wooden clocks, glass, printing presses, etc., etc.

Within the last and present years, an unusual number of manufacturing establishments, in different parts of the country, were destroyed by fire. On the 9th of August, a storm of wind and rain, of uncommon violence, caused an immense destruction of mill-dams, mills, factories, forges, bridges, etc., upon the Atlantic seaboard, particularly in Philadelphia, Baltimore and their vicinities.

The Fly-frame was this year introduced into England, from the United States, and was afterward patented there by J. C. Dyer, an American.

Thomas Amies, of the Dove Paper Mills, Lower Merion, Montgomery county, Pa., eight miles from Philadelphia, produced a sample of paper, thirty-six by twenty-six inches, weighing one hundred and forty pounds, and valued at $125 per ream, believed to be superior to any ever made in the United States. It was made from the finest linen rags, and the moulds and felts were of the best kind.

The patents issued this year numbered one hundred and seventy-three, or seventy more than the average of the twenty-seven years since the organization of the office. The list included the following: Benjamin and John Tyler, Claremont, N. H. (Feb. 1), manufacturing scythes; Genet Troost, Philadelphia (March 3), alum from lignite; John L. Sullivan, Boston (March 24), propelling boats by the application of condensed air; Joseph Webb, New York (May 3), rotary dry dock;

Phineas Dow and Daniel Treadwell, Boston (Aug. 8), manufacturing screws. This was for a machine to be operated by steam, water, or horse power, which, from a coil of wire, cut, headed, grooved, polished, and finished wood screws, at the rate of ten in a minute, and requiring no manual power except to coil on a reel, and apply one end of the wire. Jean B. Aveilhe, New York (Aug. 28), a sugar mill; Samuel Rogers and Thomas Blanchard, Boston (Oct. 3), a brad and tack machine. This machine was invented by Blanchard in 1806, at the age of eighteen, and several times improved by him while acquiring the means to introduce it. The material was put into a tube or hopper, and was delivered in the form of tacks, with heads and points more perfect than could be made by hand, at the rate of five hundred in a minute. A half ounce weight would balance a thousand. He sold the patent, for $5,000, to a company, who went extensively into the manufacture. W. R. Eagleston, Balimore (Oct. 4), setting natural and artificial teeth; George F. Hagner, Philadelphia (Oct. 13), manufacturing verdigris, and another of same date, for making white lead; Francis Hall, Charlestown, Mass. (Nov. 28), a lint loom; Moses Hall, Charlestown, Mass. (Dec. 31), dyeing and polishing morocco.

1818 The number and species of arms made and repaired at the national armories, and the expenditures upon the works, from their establishment to the end of the last year, were as follows, viz: Muskets made at Springfield Armory, from 1795 to 1817, 128,559; repaired, 45,800; carbines made, 1,202; total expenditure, $1,820,122. At Harper's Ferry Armory, from 1798 to 1817, muskets made, 82,727; repaired, 5,379; rifles made, 11,870; pistols made, 4,100; expenditures, $1,858,398. The average cost, including transportation, etc., of each musket at Springfield, was $13.56; at Harper's Ferry, $14.25.[1]

An act of Congress, concerning navigation, approved April 18th, closed the United States ports against British vessels, coming from or touching at British colonial ports, from which United States vessels were excluded. The owners, or consignees of British vessels, taking on board produce or manufactures of the United States, were to give bond in double the value of such merchandise, not to land it in British colonial ports, from which American vessels were excluded.

By an act of Parliament, and order in Council, of 8th and 27th May, the ports of Halifax, Nova Scotia, and St. John, New Brunswick, were, in consequence, opened to American vessels.

On the 20th April, Congress repealed the discriminating tonnage, and other duties, so far as related to the Netherlands, and on 24th July, the

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(1) Seybert, 627.

President, by proclamation, extended the principle of equality of trade to the free Hanseatic city of Bremen, which had abolished its countervailing and discriminating duties.

By an act of the same date, the following increased duties were to be levied, after the 30th June, in lieu of the existing rates: On articles manufactured wholly or principally from copper, and on silver plated saddlery, coach and harness furniture, twenty-five per cent. ad valorem; on cut glass, thirty per cent.; on tacks, brads, and sprigs, not exceeding sixteen ounces to the thousand, five cents per thousand; other tacks, etc., the same as nails; on brown Russia sheetings, one dollar and sixty cents; white ditto, two dollars and fifty cents per piece.

At the solicitation of the iron masters of New Jersey and Pennsylvania, who, through Mr. William Milnor, represented the prostrate condition of their manufacture, Congress also enacted, April 20th, the following increased duties, in place of those previously levied on iron and its manufactures, and upon alum. On pig iron, fifty cents, on iron castings, seventy-five cents per cwt.; on nails, four cents, spikes, three cents, and anchors, three cents a pound; on alum, two dollars per cwt.; on iron in bars and bolts, not manufactured by rolling, seventy-five cents per cwt., leaving it still charged with only one half the duty payable on rolled (English) iron. The collection laws were also amended to prevent numerous frauds.

Hammered bar iron, which, in 1814, was $125 to $145 a ton in the seaports of the United States, was at this time sold for $90 to $100, but in Pittsburg, was worth $190 to $200, and in Cincinnati, $200 to $220. Castings and hollow-ware in the latter place, were worth $120 to $130.[1] The duty was raised, by the above act, from nine to fifteen dollars per ton, and enabled many of the iron works which had been nearly ruined by the large importations the last two or three years, to resume the manufacture. In about twelve years the price of bar iron in the

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(1) At Zanesville, Ohio, where Mr. Dillon had a large iron forge, foundry, and saw and flour mills, ordinary castings were made for $120 per ton, and for machinery eight cents a pound. The best Swedish bar iron (hammered) sold for $11.50, Juniata bars at $14, and Dillon's at $12.50 per cwt. The cost of transportation from Baltimore to Zanesville, was $10 per cwt., and from New Orleans to Shippingsport by steamboat, and thence by boats to Zanesville, $6.50 per cwt. The wages of laborers was $100 to $120 per annum and found. Coals delivered, eight cents per bushel.—*Cobbett's Year's Residence in the United States.* There were other furnaces and forges in Licking and Adams counties, and other parts of Ohio, Western Virginia, and Kentucky, and air-foundries at Steubenville and other places. On King's creek, eight miles from the latter, in Brooke county, Va., a forge and furnace were in operation in 1799. But bar and pig iron were still imported from the Juniata and Laurel Hill regions, in Pennsylvania, which had extensive iron works in the vicinities of Bedford, and Connelsville. A steel manufactory had been in successful operation at Brownsville, for several years.

Atlantic cities, fell to seventy-five or eighty-five dollars, and in the western cities above named, to about fifty dollars below the price at this time, or to $100 and $110.

The quantity of bar and bolt iron imported for the year ending 30th June, was, of rolled iron, 42,312 cwt., and of hammered, 462,193 cwt.; and the exports in the year ending September 30th, were, of cut and rolled 24,430 cwt., hammered 9,902 cwt.

An iron foundry at Cincinnati employed, at this time, eighty hands, and was engaged in making engines and iron works for seven steamboats.

The whole number of steamboats constructed this year on the western waters, principally on the Ohio, was about thirty, and their success having been fully established, the business thenceforward rapidly increased; Cincinnati and Pittsburg taking a lead in it. About twenty-seven steamboats, with an aggregate tonnage of near four thousand tons, traded with New Orleans from the upper and adjacent country. The Post-office Department was about to employ steamboats to carry the mails on the Ohio and Mississippi. John Allen, Esq., of Philadelphia, was granted, by the Emperor of Austria, the exclusive privilege for fifteen years, of carrying passengers and merchandise from Trieste to Venice by steam. In the harbor of New York, steamboats were successfully employed in towing large and heavily laden ships into port, at the rate of four miles an hour, against wind and tide. On the 28th May, the first Lake Erie steamboat, called after an Indian chief "Walk in the Water," was launched at Black Rock, on the Niagara river, near Buffalo, and on 23d August sailed, under Captain Fish, for Detroit. In the next two years she made three trips to Mackinaw with troops and stores, and in July following, with two hundred passengers and a large cargo went to Mackinaw and Green Bay, in Wisconsin, being the first steamer that floated on Lake Michigan. She was wrecked near Buffalo, in Nov. 1822.

The number of Manufacturing Companies established in the State of New York, up to June of this year, under the general act of that state, was one hundred and twenty-nine, with a capital of $7,742,500, in addition to many large individual establishments.

In July of this year the "American Journal of Science and Arts" was established, to be issued in four quarterly numbers, of not less than two hundred pages each with illustrations. It was the first journal in the United States which embraced in its plan the entire circle of the Physical Sciences and their applications to the arts. Under the editorship of Professors B. Silliman, B. Silliman, Jr., Dana, and other able collators, it has continued to the present time, a valuable vehicle of sound knowledge on these subjects.

On the 4th July, the "Association of Mechanics of the Commonwealth of Massachusetts," held their first public exhibition of premium articles. In making the awards, preference was given—other things being equal—first to apprentices and next to journeymen before master mechanics. The Society had existed twenty-three years, and been incorporated twelve years. Two years after, the Apprentices' Library, in Boston, was established under its supervision.

The imports, this year, were still very heavy, amounting to $121,750,000, of which over $102,250,000 in value was retained for consumption. The value of domestic exports, though greater than in any other year previous to 1833, only discharged $73,854,437 of the indebtedness. The drain of specie was therefore very great, and the ports of Boston and Salem are said to have exported five millions of specie within twelve months. The increase in the value of the exports, consisted largely of cotton, of which a greater quantity and value was exported than in any previous year, amounting to nearly 192,500,000 lbs., worth, as cotton then sold, $31,334,258, or more than forty-two per cent. of the whole domestic exports. The average price of all kinds of cotton at the place of shipment, was thirty-four cents, and in Liverpool, about twenty pence sterling, from which it soon after declined, notwithstanding the rapid increase of the manufacture in Europe and America.[1]

The returns of exports for the year, included the first from Alabama, to the value of $95,857; and those of South Carolina, Georgia and Louisiana, were largely increased, being in the last two greatly in excess of any previous year, and probably due, in a great measure, to the increased production of cotton and sugar. The States of Mississippi and Louisiana sold cotton to the value of two millions of dollars in New Orleans, which this year increased its trade more than one-fifth. The parish of Rapides alone produced crops which, at the current price of cotton, sold for $400,000. The price of lands and the incomes of planters were in consequence greatly augmented, many of the latter realizing $30,000, and in some instances $80,000, and even $120,000 per annum from the produce of their estates. Even laborers had been known, during the last winter, to make each $100 per diem with eight

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(1) The quantity of cotton manufactured in England this year, was about 172,000,000 pounds, an increase of forty-seven per cent. in one year, and of nearly a hundred per cent. in two years. The city of Glasgow manufactured 105,000,000 yards of cotton cloth, valued at five million pounds sterling. The declared value of cotton manufactures exported from England, was $89,500,000.—*U. S. Treasury Report* 1835–36.

or ten mules, in dragging cotton a few hundred yards from the river to the warehouses, at the rate of one dollar per bale.

Many cotton mills, in Great Britain, were at this time adapted or built expressly to consume the cheaper cotton of Bengal and Surat, which consequently interfered greatly with the inferior qualities of Upland, from the United States. The exportation of cotton from India during the first six months of this year, was one hundred thousand bales in excess of the whole amount exported in the previous twelve months, and its consumption in England was increased twenty-six thousand bales, while that of American cotton was decreased twelve thousand bales. The price of cotton began therefore to decline rapidly toward the end of the year, and many shippers during the next ten or twelve months sustained heavy losses, computed in the aggregate at four millions of dollars to the mercantile classes, and at six millions in the incomes of the planters, a necessary consequence of the heavy importations of cotton from all parts of the world.

The first Cotton Factory in North Carolina, was established this year, at the Falls of Tar, or Pamlico river, in Edgecombe county, which was followed in 1822, by another near Lincolnton, on the Catawba. The former employed, in 1820, about twenty hands, and two hundred and eighty-eight spindles, and consumed eighteen thousand pounds of cotton.

The first annual message of President Monroe, in December of last year, spoke of the preservation of manufactures—which depended on due encouragement—as connected with the high interests of the nation. His second message, on 17th November of this year, referred to the provisions of the act of 20th April, amending the collection laws, as having secured to them all the relief to be derived from the protecting duties laid on imports, under which several branches had assumed greater activity, and others would probably revive and ultimately triumph over all obstacles. It suggested, however, the expediency of granting further protection.

The first Merino Sheep in Illinois—which was this year admitted as a state—were introduced into Edwards county, by Mr. George Flowers, an English gentleman, who, with Mr. Morris Birkbeck and a large number of their countrymen, formed a settlement at Albion. Mr. Flowers for many years bred improved stocks of sheep with much success, from twelve of the finest wooled merinos, selected by himself, from the royal flocks of Spain, and from those belonging to the monks of Paula and other Spanish convents.[1] Several hundred merinos were

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(1) Hall's Notes on the Western States.

taken, during the last year, to Meadville, Pennsylvania, by Judge Griffith, of New Jersey, and H. J. Huidekoper, agent of the Holland Land Company, and became the source of many fine flocks in Crawford county.

Flannels were at this time made at Chelmsford (Lowell), Mass., by Winthrop Howe, and satinets by Thomas Hurd. Gunpowder was also made there by Moses Hale. Four years later, the gunpowder mills of Tileston, Whipple, and Hale, were on a large scale with a stamping mill of forty pestles, capable of making from three to four thousand casks, of twenty-five pounds each, per annum. The proprietors had nearly completed a much larger factory near the former, on the Concord river. Their manufacture was known as "Boston Gunpowder."

A Springfield, Mass., paper advertised for sale, one thousand yards of "Straw Carpeting," from four to six quarters wide, and at twenty-eight, thirty-seven, and forty-two cents a yard.

The manufacture of Jewelry in Providence, R. I., which had been nearly abandoned in the last two years, was revived this year, and in two more years reached double its former product, or $600,000 per annum.

Dr. Dyer, of Providence, planted about forty acres of land, near the city, with currant bushes, for the manufacture of currant Wine. It became profitable, and in a few years was expected to yield two hundred pipes of wholesome and pleasant wine.

At Vevay, Indiana, nearly five thousand gallons of wine, which sold at one dollar a gallon, was made this year. Each family had a small vineyard attached to its farm.[1]

The New England Glass Company, was incorporated and established at East Cambridge (Lechmere's Point), one of the most extensive Flint Glass manufactories in the country. Two flint furnaces and twenty-four glass-cutting mills, operated by steam, and a red-lead furnace, capable of making two tons of red lead per week, enabled them to produce every variety of fine, plain, mould, and the richest cut glass, as Grecian lamps, chandeliers for churches, vases, antique and transparent lamps, etc., for domestic supply, and exportation to the West Indies and South America. Virginia coal, New Orleans lead, Delaware sand, and other native materials, were used. The capital was about $80,000, and the annual product $65,000.

Salt works on a large scale, were erected at Lewistown, Delaware, to manufacture salt by solar evaporation.

The manufacture of copperas, alum, oil of vitriol, aquafortis, salts, soap, etc., was carried on at Steubenville, Ohio, by a Mr. Gibbs, from Scotland.

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(1) Cobbett's Year's Residence, etc.

A large Sugar Refinery was put in operation in May, at Louisville, Ky., by Maltz & Jacobson, which made about three hundred loaves of five pounds each, or fifteen hundred pounds of refined sugar every twenty-four hours. The largest Soap and Candle factory in the western country, was at Louisville. It was owned by Peterson & Co., and produced twelve thousand pounds of soap per week, and one thousand pounds of candles daily, and had a capital of $20,000. Chewing tobacco, snuff, and segars, were made to the value of $8,000 per annum.[1]

A manufactory of Cloths, superfine and coarse Flannels, Blankets and Paper, at Lexington, Ky., said to be the largest and best supplied with machinery of any in the United States, was this year compelled to suspend operations on account of foreign importations. Its capital was $150,000, and it employed two hundred men, consuming one hundred thousand pounds of wool and one hundred tons of rags, the yearly product of which was $400,000. Of eight manufactories of cotton bagging, at the same place, only one was in operation in 1820, in which year there were in the county, five manufactories of cotton yarn, two of cassimeres, cassinets, cloths, etc., twelve of cordage, twine, and bagging, and one of cordage and sail duck; nearly all of which had either ceased operations or greatly reduced their business. There were other manufactories of cotton and wool, paper, gunpowder, soap and candles, red and white lead, etc.; bells and other brass and iron castings; beer, etc., in Lexington and vicinity.

The value of the rags collected in the United States for the use of paper makers, was estimated at $900,000 per annum.

PATENTS.—To Jeremiah Black, Northumberland, Pa. (Jan. 17), an Archimedean screw; Eb. Jenks, Colebrook, Conn. (Jan. 28), converting iron partially into steel; Cyrus Jackson, Otsego, N. Y. (Feb. 11), auger for boring square holes; W. S. Langworthy, Ballston, N. Y. (Feb. 28), and Lynus North, Otsego, N. Y. (May 28), metallic combs;[2] D. Pettibone, Philadelphia (April 10), machine for cutting combs; another to same (Aug. 11), for manufacturing combs; Sylvester Nash, Harper's Ferry, Va. (April 11), Seth Youngs, Hartford, Conn., (May 1), and Asa Waters, Middleburg, Mass. (Dec .19), each for turning gun barrels; also to D. Dana and A. Holmead, Canton, Mass. (Aug. 24), for lathes for turning gun barrels; Cyrus Eastman, Hillsborough, N. H. (April 16), rolling metallic tubes; Adam Ramage, Philadelphia (May 23), printing presses;[3] A. Wheeler, Concord, Mass. (June 10), dis-

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(1) McMurtrie's Sketches of Louisville.

(2) A manufactory of brass combs made from brass wire was in operation in Saratoga county two years later, and the article was in much demand.

(3) A patent hand press, called the Co-

charging a gun seven or more times; John B. Breithler, New Orleans, La. (June 13), machine for grinding sugar cane; Samuel Rogers, Bridgewater, Mass. (June 24), rolling mill for sheet iron; Abraham L. Pennock and J. Sellers, Philadelphia (July 6), two patents, one for hose or leather tubes and one for mail bags. The first of these patents was an important improvement in fire apparatus, which had been eight or ten years in use, and consisted in making the hose of sole-leather by overlapping and riveting with copper or iron rivets, instead of sewing, and since exclusively practiced. Riveted hose was first introduced by the Philadelphia Hose Company, for whom it was executed by Messrs. Sellers, Pennock & Morris, No. 231 Market street, whose successors still carry on the business. The male and female connecting screw and swivel joint for connecting different sections of hose, was the invention of Jacob Perkins, who introduced it with the rivetted hose into England in 1819. George F. Valentine, Albany, N. Y. (Aug. 26), crystallizing tin; Edmund Warren, New York (Aug. 27), a loom. This improved loom, which was quite simple in construction, and cost only ten dollars, wound the cloth on the beam as it was woven, and the yarn was taken by the same process. It could be extended to weave any breadth, and a person accustomed to it could weave sixty yards a day. The patentee subsequently took out seven patents for threshing machines. Lewis Viales, New Orleans, La. (Oct. 29), a cotton inspecting machine; Aaron M. Peaseley, Boston, Mass. (Nov. 11), organs; David Mellville, Newport, R. I. (Nov. 13), argand lamps.

1819

The embarrassments which had been pressing heavily upon the manufacturing classes since the peace—chiefly in consequence of the unchecked importation of foreign goods, and the vitiated state of the national currency—culminated this year in the severest sufferings of a large portion of the community, which became involved in financial distress. Importations having been for several years, and still continuing greatly in excess of the exportations, according to the immutable laws of trade, the balance had to be paid principally in solid money, of which,

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lumbian Press, was this year introduced in England in an improved form, by Mr. George Clymer of Pennsylvania, the inventor. In the style of finish and embellishment, with various devices emblematic of the art, it exceeded any thing known to the trade there, and the printed certificates and testimonials of masters and workmen, were much in its favor. The press of Mr. Ramage was probably an improvement upon the Scotchpress, invented by his countryman, Mr. Ruthven of Edinburgh, and introduced here about this time by the patentee. It was much esteemed for fine work, but was soon after superseded by the introduction of rollers for which it was not adapted.

the augmented trade with India and China,[1] had absorbed a large proportion. The Bank of the United States had been compelled to import specie, in the first sixteen months of its operations, to the amount of over seven and a quarter millions, at a cost of more than a half a million of dollars. The exportation of specie during the same period, was supposed to have exceeded the importation by the banks and individuals. The metallic currency remaining in the country, instead of entering into circulation, had, since the resumption of specie payments in 1817, remained in the vaults of the banks until drawn out at a premium for exportation. The paper currency had, at the same time, been violently contracted from an aggregate, in 1815 and 1816, of one hundred and ten millions to about forty-five millions at this time,—a reduction of fifty-nine per cent.,—thereby reducing prices, and checking enterprises created by its previous undue expansion. While the banks were thus contracting their discounts, the principal American staples began, toward the close of the last year, to decline rapidly from the high price they had commanded for a number of years in foreign markets. The reduction in the price of cotton and breadstuffs soon reached fifty per cent., and the losses thereby sustained, rendered additional loans necessary to the merchant at a time when it was most difficult to obtain them. The result was most disastrous both to the merchant and the agriculturist. But upon the manufacturer—overborne by unequal competition with his foreign rival, and suffering equally with the merchant and farmer, from the inability of all classes to purchase—the change fell with crushing weight. The price of raw cotton continued to decline with considerable uniformity, from this time forward, for at least a quarter of a century.

Flour had also gradually fallen off from its high price of ten to fifteen dollars a barrel in 1817, to five or six in the present year, in domestic ports; and tobacco, from $148 in 1817, to $110 in this year, and $75 in 1822. A like depreciation in other crops, greatly diminished the power of a large portion of the population to purchase manufactures, or even to discharge obligations already contracted in anticipation of their revenues. A general paralysis now fell upon all branches of industry. The distress became more general and severe than had ever been known, and but little alleviation was experienced for several years to come. The banks suffered from lack of specie. Bankruptcies over-

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(1) The importation of specie into the single port of Canton alone, in one year, embracing portions of this and the preceding year, was $7,414,000, which was probably not more than one-half the total exports of solid currency to Europe and Asia.

took the mercantile and shipping interests, whose merchandise lay on their hands, and whose ships could neither be employed nor sold, save at ruinous losses. Rents and the value of all real estate were enormously depreciated. Farms were mortgaged or sold at one half and one third their value. Factories and workshops were everywhere closed. Manufacturers were forced to abandon extensive and flourishing establishments, reared as if by magic in the last few years, and with their operatives and multitudes of handicraft workmen entered into competition with the cultivators of the soil, and swelled the products of agricultural labor, for which there was no longer a market.

The suffering among manufacturers was more severe in Rhode Island, New York, and Pennsylvania, than elsewhere. The number of persons thrown out of employment since the peace was variously estimated at from forty to sixty thousand, and with their families, the number deprived of support was computed at one hundred and sixty to two hundred and forty thousand. The cities of Philadelphia and Pittsburg suffered extremely, and the Western country generally, participated in the common distress.[1] The extent of the suffering throughout Pennsylvania was forcibly portrayed in the report of a committee of the Legislature appointed to investigate its causes, and to prepare remedies.[2] A memorial was also presented to Congress from the western part

(1) A committee of the citizens of Philadelphia, appointed in August, reported in October, that in thirty out of sixty branches of manufacture there had been a reduction from the average of 1814 and 1816, in the number of persons employed, from 9,425 to 2,137; in their weekly wages, from $58,340 to $12,822; and in their annual earnings from $3,033,799 to $666,744. The actual loss of wages was therefore $2,366,935 per annum; and supposing the materials equal to their wages, the loss of productive industry in a single district, not forty miles in diameter, was $7,333,870. In the cotton manufacture the hands were reduced from 2,325, in 1816, to 149; in book printing, from 241 to 170; in the potteries, from 132 to 27; in the woolen branch, from 1226 to 260; in iron castings, from 1152 to 52; in paper hanging and cards, from 189 to 82. In the paper manufacture in their vicinity the hands were reduced from 950, in 1816, to 175, and their annual wages from $247,000 to $45,900; the annual production from $760,000 to $136,000. A committee of citizens of Pittsburg, in December, reported the whole number of hands employed in that town and vicinity, in 1815, to have been 1,960, and the value of their manufactures $2,617,833. In 1819 the hands numbered only 672, and the value of their manufactures was $832,000. In the steam engine factories the workmen were reduced from 290 to 24, and the value of their work from $300,000 to $40,000. In glass works and glass cutting the hands were reduced from 169 to 40, and the product from $235,000 to $35,000; the reduction in flint glass alone having been $75,000. In the manufacture of cotton, wire, umbrellas, yellow queensware, pipes, and linen, there was no longer a single hand employed.

(2) The actions for debt in the Pennsylvania courts this year were 14,537, and the number of judgments confessed was 10,326, exclusive of half as many more before justices. The imprisonments for debt in the city and county of Philadelphia were 1,808.

of the state, complaining that manufactures were in the last struggles of dissolution, estates were sacrificed, families ruined, agriculture was declining, internal trade was extinguished, capital was dormant, and thousands were idle.

> "The wants and calamities of the people demanded an interposition radical in its character, and vigorous in the means of its accomplishment. Every man sees and feels that the excessive use of foreign goods has brought our country to the verge of destruction, and that nothing short of permanent and ample patronage to our own manufactures can afford any relief. The fallacy of buying at the cheapest market no longer stands in our way, nor will Congress be again alarmed with the danger of imposing regulations upon trade."

In Rhode Island, New York, and other manufacturing districts, similar reductions of labor, and sacrifices of mills and property for a fraction of their original cost, were quite common, many establishments being entirely broken up.

The question of protection to the manufacturing interests began once more to be agitated as indispensable, and numerous appeals were made from various quarters to Congress for its interposition. Many able advocates appeared in behalf of legislative measures, considered of vital importance to a class threatened with total ruin, and among the most able was Matthew Carey, of Philadelphia.

The duties on imports were already as high as Congress deemed it prudent to go. But the Secretary of the Treasury, on 8th February, in conformity with a resolution of the House of 20th April last, reported on the propriety of laying specific duties upon articles then charged ad valorem, and proposed a schedule of such articles, with specific rates attached, greatly higher than the existing ad valorem duties.

Acts were passed on 3d March, altering the duties on certain wines and the bounties to fishing vessels; also for the more effectual suppression of the slave trade and of piracy.

In consequence of a resolution of inquiry of December last, it was announced to the Senate by the Committee on Military Affairs, that by a regulation of the proper department, preference was now given to domestic manufactures in clothing the army, when they were to be had on reasonable terms, rendering a law on the subject unnecessary.

About the 24th May, the steamship Savannah, of 380 tons, the first that ever crossed the Atlantic, left Savannah, Georgia, for Liverpool, where she arrived on 20th June. Having consumed all her coal in ten or twelve days, the remainder of the voyage was made under canvas. She was built by Croker & Fickett, Corlears Hook, N. Y., and commanded by Captain Moses Rogers, who had been in command of Fulton's boat, the "Clermont," and of the Phœnix, on the Delaware. She proceeded to St. Petersburg, taking in Lord Lyndock at Stockholm, who presented the captain a silver teakettle, with an inscription expressive of his pioneer character, and in October returned to Savannah in twenty-two days under sail. She subsequently ran as a sailing packet between New York and Savannah, until lost in 1822.

On the 19th May, the steamboat Independence, Captain Nelson, built at Pittsburg in the last year, arrived at Franklin (Boonslick), on the Missouri, in seven sailing days from St. Louis, with flour, sugar, whisky, iron castings, etc., having been the first to stem the current of that river. Thirty-four steamers were built on the western rivers during the year, one of which, the Western Engineer, built near Pittsburg, under the direction of Major Long of the United States Topographical Engineers, for the expedition to the Rocky Mountains, was the first that ever reached Council Bluffs, 650 miles above St. Louis.

The Analectic Magazine for July (vol. 24, p. 67), contained the first published specimen of American lithographic printing, an art of recent introduction from Germany into England, where two silver medals were this year awarded by the Society of Arts for specimens on German and English stone. The design and execution of the print, from the drawing to the impression, were the work of Mr. B. Otis of Philadelphia, at the suggestion of Dr. Samuel Brown of Alabama and Judge Cooper. It was executed upon a stone from Munich—the birthplace of the art—presented to the American Philosophical Society by Mr. Thomas Dobson. Mr. Otis had also executed specimens of lithography, upon lithographic stone procured by Doctors Brown and Cooper, and Mr. Clifford, through Dr. Blight, from a limestone quarry, near Dicks river, Ky. Specimens of white lithographic stone were about this time deposited in the Troy Lyceum by Isaac McConike, Esq., who found it alternating with compact limestone in Indiana.[1] The lithographic art was introduced, in an improved form, in New York, in 1822, by Barnett & Doolittle, who had received regular instruction in Paris.[2]

A Society for the Encouragement of American Manufactures and Domestic Economy, established conformably to a resolution of the citizens of Baltimore in February, was incorporated during the year as the Maryland Economical Association.

The Society of Tammany, or Columbian Order, in New York, of which Clarkson Crolius was grand sachem, appointed a committee on the subject of National Economy and Domestic Manufactures, and to report an address to all members of the order throughout the Union. This

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(1) Eaton's Geology of Northern States, 2d ed., pp. 232, 238–9.

(2) Silliman's Journal, ch. 4, p. 170.

was adopted on 4th October, and circulated through the public prints, explaining the causes and suggesting remedies for the national calamities. Resolutions were passed pledging the members to practice frugality, and to discontinue the importation and use, in their families, of every article of foreign manufacture which could be reasonably substituted by American manufactures, and recommending the same course to all their friends.

The universal interest awakened on the subject by these and similar organizations throughout the country, and the numerous memorials in preparation, asking of the Legislature an amendment of the tariff, induced the sixteenth Congress, on the 8th December, immediately after assembling, for the first time, to institute a standing Committee of Manufactures, to take charge of the accumulated business of what had now become one of the cardinal interests of the nation.

Messrs. Miller and Hutchins, of Providence, proposed to publish a periodical devoted to Domestic Manufactures, to be called The Manufacturers' Journal.

The price of Domestic Cottons, of the kind first made at Waltham, Mass., was at this time twenty-one cents a yard, or nine cents below the price in 1816. The Waltham Company, on account of its large capital and machinery, was enabled to withstand the financial pressure which carried away many of the cotton and woolen manufactures of New England, and was supposed to be unfavorable to an increase of duties. Several of its proprietors, in the midst of general depression, were looking for a suitable locality for a more extended business, which was soon after found in the water power of Lowell.

The first mill on the canal in the manufacturing borough of Manayunk, now in the city of Philadelphia, was built this year, by Capt. John Towers, and commenced running on 10th November. The first manufacturing in the place, was done by Isaac Baird. The first mill, since known as the "Yellow Mill," was afterward owned by a Mr. Rising, and still later by Mr. Joseph Ripka, to whose enterprise the growth of the place is principally due.[1] The second factory was erected by Charles V. Hagner, and the third by Mark Richards.

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(1) Mr. Ripka, a native of Austrian Silesia, was, in 1814, the proprietor of a small cotton and silk factory at Lyons, and was at this time running a few hand-looms in Kensington, in the manufacture of cottonades. The superior quality and style of his goods made them popular, and soon after, in order to meet the increasing demand, he removed to larger premises on Poplar street, when the manufacture of his "Rouen Cassimeres," an article of pantaloon stuffs, was greatly extended, though he was still confined to hand-loom weaving. Having opened a warehouse in Front street, the profits of his manufacture enabled him, soon after, to fit up power looms on the Pennypack, near Holmesburg, and in 1828, he built his first mill at Manayunk, which then contained ten factories of

The Legislature of New York appropriated $20,000 for the promotion of Agriculture and Family Domestic Manufactures, to be equally divided among the County Agricultural Societies, and expended in two years. It also enacted a general law for the incorporation of Agricultural Societies, for which a new one was substituted in 1841. Similar appropriations to the above were made by the New Hampshire Assembly, in 1818.

The manufacture of Porcelain, of fine quality, from domestic materials, was commenced in New York, by Dr. H. Mead.

General Cass, accompanied by Mr. H. R. Schoolcraft, visited, this year, the copper mines of the Ontonagon and the southern shore of Lake Superior west to the Mississippi, including the Lead region of Missouri. Mr. Schoolcraft found forty-five lead mines at work in Missouri, thirty-nine of which were in Washington county. They were estimated to produce three million pounds of lead, and to employ eleven hundred hands. Mine à Burton and Potosi Diggings together, produced, between 1798 and 1816, 9,630,000 lbs. or half a million annually. The marshals, in 1820, reported four stone furnaces in Crawford county, Michigan, with a capital of $4,600, making bar lead at $4.50 per cwt., which found ready sales at south.

On the 10th November, Mr. Constant A. Andrews, of Pennsylvania, in connection with Messrs. Owens and Dixon, put in operation a saw mill, "not much inferior to any in the United States," upon Black river, a branch of the Mississippi, between Prairie du Chien and Lake Pekin, and about thirty miles east of the lake. It was probably the first in Wisconsin, and was erected by consent of the Sioux Indians, but was soon after burned, it is supposed, by the Winnebagoes.

Jacob Perkins, late of Philadelphia, took out a patent in England (Oct. 11), for "Machinery applicable to Engraving; transferring engraved or other work from the surface of one piece of metal to that of another;" (transferring difficult engravings for the production of bank notes.)[1]

Among the United States patents granted this year were the following: To James Barron, U. S. N., Norfolk, Va. (Jan. 12), for corks for

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different kinds. employing six hundred and thirty-six hands. During the next fifteen or twenty years, he became the proprietor of five factories at Manayunk beside tenements, one in Northern Liberties, one at Chandlersville, Delaware, and of a large factory and print works on the Pennypack, employing, together, twelve hundred hands, and giving support to probably three thousand persons. The value of his manufactures exceeded one million dollars annually, and included Canton Flannel, which was extensively made and improved by him on its first introduction. His agencies extended to all the principal cities.

(1) Newton's London Journal, vol. 1, p. 159.

bottles; to the same (Feb. 20), for an air pump for extracting foul air from ships. For a cut and description of this ship ventilator of Commodore Barron, to whom both the above patents were renewed by special acts of Congress in 1833, and also for a plan, submitted by him to the Secretary of the Navy, for constructing vessels so as to prevent decay, see Portfolio for November, 1826. He took out seven or eight different patents, including one for constructing ships. To Samuel Morey, Oxford, N. H. (Jan. 19), for shooting with steam; John L. Wells, Hartford (Feb. 8), a printing press. This was the first in which long levers were introduced *end-wise* with success. Burgis Allison and William Elliott, Washington, D. C. (Feb. 20), printing by means of rollers; Silas Mason, Norfolk, Mass. (Feb. 20), manufacturing hats. This was for a carding machine, which produced the hat in its conical form at one operation. Francis Guy, Baltimore, Md. (Feb. 23), paper carpet; William Sheldon, Springfield, Mass. (Feb. 26), tanning with bark of chestnut trees, and John Lansing, Jr., Albany, N. Y. (April 30), tanning in hemlock; William Garret, New Lisbon, N. Y. (Feb. 27), manufacturing emory; A. W. Foster and J. Hugus, Greensburg and Hempford, Pa. (April 26), converting rectilinear into rotary motion; Robert Graves, Boston, Mass. (April 10), for cordage. This patent cordage, for which two other patents were granted in the following years, was extensively manufactured in Boston by Winslow, Lewis & Co., who used Graves's machinery, worked by horses, and in 1821, employed one hundred men and boys, and sold 746 tons of patent cordage, for $180,000. James Wischeart, Wayne county, Ind. (May 25), making sugar from wheat, rye, &c.; William K. Clarkson, Jr., New York (June 26), velocipedes; Richard Bury, Albany, N. Y. (Aug. 21), glass strings for pianofortes; Daniel Pettibone, Boston, Mass. (Aug. 21), welding cast steel to iron; Jethro Wood, Poplar Ridge, N. Y. (Sept. 1), a plough. This was for the cast iron plough, which was the foundation of many subsequent improvements, and the patent was renewed by act of Congress, in 1834. Thomas Blanchard, Middlebury, Mass. (Sept. 6), turning gun stocks; Daniel Gillett, Springfield, Mass. (Sept. 15), preparing cotton seed for food; Cyrus Hawes, Bennington, Vt. (Dec. 15), carpenters' squares;(1) B. Croasdale, Byberry, Pa. (Dec. 21), machine for making brushes of broom corn; also, to Shadrach H. Weed, Poughkeepsie, N. Y. (Feb. 3), for broom making.

(1) The first manufacture of carpenters' steel squares, in the United States, was commenced at North Bennington during the ensuing year, and in 1842 two establishments in the village made from twelve to fifteen thousand annually, having nearly superseded the foreign article.—*Thompson's Gaz. of Vt.*

CHAPTER IV.

ANNALS OF MANUFACTURES.

1820—1830.

Evidence of the general and increasing embarrassments of every branch of industry continued to press itself upon the attention of the National and State Legislatures. **1820** Immediately upon the assembling of the sixteenth Congress, at its first session in December, memorials and petitions began to pour in from various bodies of manufacturers and others in different sections of the country, ascribing the pecuniary distress of the times to the immoderate use of foreign commodities, and complaining of the inadequacy of the general Tariff and existing revenue laws to afford suitable protection to the native industry against the combined efforts of cheap production, fraudulent invoices, protracted credits and unlimited sales at auction, whereby the country had been deluged with foreign merchandise, to the ruin alike of the farmer, the importer, and the manufacturer.

A Convention of the Friends of National Industry, composed of delegates from nine states, viz.: Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Ohio, who assembled in New York on the 27th August of the last year, to take into consideration the prostrate condition of manufactures, and to petition Congress—presented a memorial on the 20th December, in which the following measures were recommended as likely to remove the existing embarrassments of the country, and to restore life and vigor to the almost expiring manufactures. These were—to abolish credits on impost duties—to impose a restrictive duty on sales at auction, and to alter and increase the duties on imported goods.

The practice allowed by law of giving one to two years' credits on imposts upon East India and China goods, and the perversion of the system of auction sales from its original intention, it was conceived, exerted a most injurious effect upon the fair American trader, upon the manufacturer and the community in general, by encouraging speculation, and flooding the markets with cheap but worthless fabrics of silk, woolen, cotton, and other materials, manufactured in the East Indies and in Europe expressly for such sales, and which, by their high finish, concealed their flimsy texture until they reached the consumer.

It appeared, from the returns of the auctioneers themselves, that the sales of foreign goods at auction, in the city of New York alone, amounted, in the year 1818, to fourteen millions of dollars, and the quantity annually sold in the same way in the United States could not, it was believed, be less than thirty millions in value, a large part of which was on foreign account. Increased duties were asked for upon a number of leading articles, and the great disparity between the American and British tariffs upon several important articles of manufacture was shown, the United States ranging from seven and a half to thirty, and the British from forty-one and a half to seven hundred and fifty-five per cent. ad valorem. A memorial to the same effect, from the American Society of the city of New York, for the encouragement of domestic manufactures, presented April 24, prayed that the importation of cotton goods be restricted by law, to such only as were wholly manufactured from cotton grown in the United States. Memorials were also sent in from the manufacturers of paper, books, leather, etc., and from the inhabitants of different states and cities, urging suitable protection to manufactures, a change from ad valorem to specific duties, and other modifications of the revenue laws. Opposition to any proposed change was made by the agricultural and mercantile interests in various places, among which the Agricultural Society of Fredericksburg, Va., and the United Agricultural Societies of Prince George, Sussex, Surry, Petersburg, Brunswick, Dinwiddie, and Isle of Wight, in the same state, whose secretary was Mr. Edward Ruffin, were the first to denounce, in memorials presented on the 3d and 17th January, any increase of duties as a tax upon the agriculturists, who were the principal consumers.

A lengthy and able memorial, believed to be written by Judge Story, was also presented, January 31, from the merchants of Salem, Mass., whose India trade had been destroyed by the minimum duty on coarse cottons, against an increase of duties on imports, or any change of the revenue system in relation to credits and drawbacks. These remonstrances produced an elaborate memorial from the Pennsylvania Society for the Encouragement of American Manufactures, drawn up by Mr. Carey, and a second appeal from the New York Society, the latter of which stated that twelve thousand packages of goods, on which the duties were estimated at one million dollars, had been sold at auction in that city between the 1st of January and 15th of April,—the duties thereon had become so much active capital, loaned by the Government to foreign manufacturers, or their agents in this country, to aid them by such operations in crushing the enterprise and industry of the nation. The Chamber of Commerce of New York and Philadelphia also opposed a change in the system of credits for duties, and the former likewise a tax on auction sales. The merchants of Baltimore were part in favor of a cash system, and another part opposed any change in the revenue laws.

The Legislature of New York, on 1st February, adopted resolutions to request its senators and representatives in Congress, to use their influence in obtaining such a revision and regulation of the tariff, as should reduce the importations and effectually protect manufactures, and also recommending all members of the Legislature, officers of government, their representatives in Congress, and citizens generally, to clothe themselves in fabrics of home manufacture, and to promote their introduction into general use in preference to foreign manufactures.

Notwithstanding the numerous petitions for a revision of the tariff, signed by at least thirty thousand persons, the views of the merchants and planters prevailed. A bill introduced by Mr. Baldwin, from the Committee on Manufactures, proposing a moderate increase in the duties, although it passed the House by a vote of ninety to sixty-nine on 28th April, was afterward lost in the Senate, where the vote stood twenty to twenty-one. The period of general relief was thereby postponed for another four years.

On the 17th March, Congress passed an act making provision for taking the fourth census of the population, the numeration to commence on the first Monday in August. The tenth section provided for taking, at the same time, under the directions of the Secretary of the Treasury, an account of the manufacturing establishments and manufactures, for which extra service the marshals were to receive twenty per cent. additional compensation.

A supplement to the Navigation Act of 18th April, 1818, was approved May 15th, by which United States ports were closed, after 30th September, to all British vessels arriving from colonial ports on the continent or in the West Indies, not included in the former act, and requiring the owner, consignee, or agent of British vessels, on taking in cargoes of the growth, produce, or manufacture of the United States, to give bond not to land the same in any of the British possessions described in either act, provided that the convention of 1815 was not infringed by the prohibition. No importations from any such British possessions were to be permitted after the above date.

The suffering produced in the West India Colonies by these retaliatory acts, gave rise to an appeal to Parliament, which resulted in the opening of the West India ports to American vessels, and consequent relief to the mercantile and agricultural interests of the United States.

On the third of May, the first permanent Committee of Agriculture was appointed by Congress to have charge of that branch of industry.

Among the petitions presented early in the session, was one from Mr. John Adlum, of the District of Columbia, calling the attention of Congress to the fact that he had succeeded in making wine of superior quality from native grapes. Mr. Adlum was one of the most zealous of the early promoters of the wine manufacture in this country, and especially in recommending the Catawba grape, but did not succeed in making good wine on a large scale, partly in consequence of the want of the means which he at this time solicited.

The General Assembly of Pennsylvania passed, March 6th, "An Act for the promotion of Agriculture and Domestic Manufactures," authorizing the incorporation of companies for these objects, by the Governor of the Commonwealth.

The Apprentices' Library, founded by voluntary contributions in Philadelphia, during the last year, and the Boston Apprentices' Library, commenced on 22d February, of the present year, under the supervision of the Massachusetts Charitable Mechanics' Association, were the first of that useful class of institutions established in this country, if not in the world. The Mercantile Library of Boston, was also founded on 11th March of this year, and the Apprentices' Library of Cincinnati, during the ensuing year.

The manufacture of Chain Cables was about this date commenced at Boston, by Cotton & Hill, who, for thirty years, were the only successful manufacturers of cables, in which they established a reputation at home and abroad. They were, however, ultimately compelled to abandon the business on account of the low price of English chains of inferior quality, but resumed it again in 1856.

Heavy Anchors were forged at South Canaan, Litchfield county, Connecticut, from the superior iron of that neighborhood, by the Hunt Brothers; who, during the year, made two, of eight and nine thousand pounds' weight respectively, for the seventy-four gun ship *Franklin*. Screws of the largest kinds for powerful machinery, were also made and cut by water power in their establishment. Anchors were made at twelve and a half cents a pound, in or near Baltimore, but were undersold by imported anchors of inferior English iron, which had already caused a suspension of the business.

Thirty Iron Works had been built in Pennsylvania during the last ten years, of which fourteen were charcoal blast furnaces, and sixteen bloomeries. The business labored under great depression on account of the limited demand, and a decline in the price of bar iron from $140 to $80 and $100 per ton, since 1818, chiefly occasioned by importations of iron and iron-wares, and the general prostration of all kinds of business. In Washington county, Maryland, an iron works consisting of two forges, and slitting mill, with a capital of $100,000, which had been in profitable operation for sixty years, was about to cease operations for want of demand. Pig iron sold for thirty dollars, and castings for seventy-five dollars per ton. In East Tennessee, which had between thirty and forty forges and furnaces, twelve of them in Carter county, and in other places remote from foreign competition, bar iron continued in good demand at ten to twelve and a half cents a pound.

The first regular commencement of the Anthracite Coal Trade of Pennsylvania, was made this year, by the shipment from the southern Anthracite region at Mauch Chunk, on the Lehigh, of three hundred and twenty-five tons or sixteen thousand bushels, to Philadelphia. It was sent by artificial navigation, opened by the Lehigh Navigation Company, and was mined by the Lehigh Coal Company, both of which were organized in July, 1818, and this year merged in one association, called the Lehigh Coal and Navigation Company, which was incorporated in 1832, and has since greatly developed the mineral riches of that region and improved the transportation. The coal was delivered at the doors of purchasers at $8.50 per ton. About seventy thousand bushels of stone coal were mined in Alleghany county, Maryland, this year, at a cost of six and a quarter cents a bushel; a part of which was sent down the Potomac in boats.

A steam ship, called the "Robert Fulton," of one thousand tons, was built this year at New York, for Messrs. Dunham & Lynch, by the eminent naval architect, Henry Eckford, who, during the late war, had constructed, with incredible dispatch, and to the entire satisfaction of the Government, a fleet upon the lakes, and had established the reputation of New York merchant ships, as equal to any in the country. The Fulton was intended for the New York and New Orleans trade, and attained a speed of nine miles an hour, which was regarded by the distinguished inventor, whose name she bore, as the maximum speed of steamboats, and was not surpassed for many years. The speculation was ruinous, however, to her owners, and the vessel having been sold, afterward became the fastest sloop of war (under sail) in the Brazilian navy.

The total value of the Book Publishing business of the United States, this year, was estimated, by the late S. G. Goodrich (Peter Parley), at $2,500,000, viz.: of school books, $750,000, classical, $250,000, theological, $150,000, law, $200,000, medical, $150,000, all others, $1,000,000. The relative proportions of British and American books consumed, was stated to be, of American thirty, and of British seventy per cent. of the whole. During the next thirty years, the proportions were reversed, the American forming seventy and the British thirty per cent. of the whole.

Of seventy paper mills in full operation in Pennsylvania and Delaware, at the close of the war, containing ninety-five vats, which cost about half a million dollars, and employed nine hundred and fifty persons, producing paper to the value of $800,000 per annum, but seventeen vats were at work at this time, producing $136,000 worth per annum. The number of hands had been reduced seven hundred and fifty-five, and the product $624,000, by the importation of paper, chiefly of low price, from the south of Europe. The manufacturers of these states, and of Baltimore, asked for a duty of twenty-five per cent. on foreign papers.[1] The whole annual value of the manufacture in the United States, was estimated at an average of three millions of dollars, the materials and labor at two millions, and the number of persons employed at five thousand. Congress, at this time, used English paper, although the Messrs. Gilpin, who employed near half a million capital in the manufacture, on the Brandywine, offered paper, allowed to be equally good, at twenty-five per cent. less price.[2]

The manufacture of starch from potatoes, for which a patent was granted, in 1802, to John Biddis, of Pennsylvania, had been recently established in Hillsborough county, N. H. The demand was principally for the cotton manufactories, which contained, in that county, exclusive of cotton and woolen factories, over four thousand spindles, and upward of fifty power-looms, employed on shirtings, tickings, checks, ginghams, yarn, etc. Many of these were idle at this time, or greatly depressed in consequence of a decline in the price of yarn of about fifty per cent., since 1812–13.

A manufactory of Vestings, Worsted, and Silk cloths, recently esta- in Providence, R. I., was said to be the only one of the kind in the United States. An infant manufactory of worsted stuffs, in Bristol county, calculated to run six hundred to eight hundred spindles, but having only seventy-two in operation, had, however, produced vestings of fine texture, and many other kinds of worsted and fine cloths, which had exceeded expectation.

Six establishments in Litchfield county, Conn., made 11,450 brass and wooden clocks, valued at $75,400, nearly the whole of which resulted from the industry and ingenuity employed on them.

The returns of the marshals represented a manufactory of Prussian blue, from leather shavings, to the value of $4,500 annually, in Rensselaer

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(1) Memorials to Congress. (2) Munsell's Chronology of paper, etc.

county, N. Y., and one of hulled and pearled Barley to the value of $5,000 in Newcastle county, Del., as probably the only establishments of the kind in the United States.[1] The manufactures of Albany and vicinity were quite numerous, that of ale and strong beer being, next to flour, the most valuable, employing four breweries, which made to the value of $54,000 per annum, and were prosperous. The manufactories of the city and county of New York, embraced, among many others, two of oil of vitriol and chemical drugs in great variety; one of chrome and other colors, of red and white lead, of black lead-pencils and crayons, fancy transparent and perfumed soaps, patent floor cloths, types, etc., which had been several years in operation.

The manufacture of Iron Railing and House work, and of Needles and Fish hooks, imported in an unfinished state, and prepared for market at from one to twenty dollars a thousand, were among those of recent introduction.

The Salt manufacture of the United States employed, in Massachusetts, a capital of about $777,000, which yielded a product of $95,000; and seventy-nine establishments in the town of Salina, New York, upon land leased by individuals from the state, of which the product, inspected by the Government superintendent, for the year ending Nov. 7, was 554,776 bushels. On this a tax of one shilling a bushel was paid toward the canal fund. In Genesee county, about 83,000 bushels were made. In Kanawha, Va., twenty-three salt making establishments, with a capital of $696,000, and eighteen hundred and twenty kettles, etc., made salt at seventy-five cents to one dollar a bushel, but suffered by competition with foreign salt, brought from New Orleans in steamboats. Kentucky had upward of sixteen hundred kettles employed, and made salt worth about $190,000 per annum, and in New Hanover county, N. C., salt was made by solar heat to the value of $13,350. About $33,000 was invested in the same business in western Pennsylvania, and smaller amounts in other places.

The population of the United States in August, as returned by the fourth census, was 9,638,131, having increased 33.13 per cent. in ten years. The active population was distributed as follows: number engaged in Agriculture, 2,075,363, in Manufactures, 349,663, in Commerce, including country shop-keepers, 72,558.

The returns on the subject of manufactures, although the schedules furnished were more comprehensive than on former occasions, and

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(1) The manufacture of Prussian blue was recommended, and the process described, with many original observations and experiments, in a volume of "*Chemical* and *Economical Essays*," published in 1790, by Dr. John Pennington, while a medical student.—See Mease's Archives, vol. iii., 129.

embraced nearly the same objects of inquiry as at present, were exceedingly defective, partly on account of the inadequate compensation allowed the enumerators, and partly from the inability or reluctance of manufacturers to give the details of their business. A digest of the accounts on this subject, which a resolution of Congress, approved March 30, 1822, authorized the Secretary of State to have made and published, was found, upon its completion, to be so imperfect an exhibit of this branch of the national industry, that the Secretary was only constrained, by the imperative nature of the requisition, to permit its publication, and the House of Representatives had nearly resolved to suppress the whole document, and tabled a resolution providing for the distribution of the books. The digest, however, when studied in detail, furnishes much useful information respecting the existing state of individual establishments and branches of industry, and shows the nature and extent of the embarrassments under which the manufacturers labored at this time. Although some branches of industry, particularly that of cotton, and others favorably situated, were tolerably prosperous, and there were indications of general improvement, large losses were reported as having been experienced within a few years. In all parts of the Union, machinery and fixed capital, to a large amount, were either lying idle, or were employed at a very meagre profit, in the hope of a favorable change. The products and the profits of manufactures had, in general, been greatly reduced, and much property had changed hands at ruinous sacrifices. The decrease in the aggregate value of manufactures returned, as compared with the census of 1810, was in part caused by the omission of all manufactures strictly domestic or household, in the fourth census, and which were included in the third.

From a report based on these returns made by the Secretary of State, in September, 1824, in obedience to a resolution of the Senate, we take the following:

STATEMENT OF THE AMOUNT AND VALUE OF DUTIABLE ARTICLES MANUFACTURED ANNUALLY IN THE UNITED STATES AND TERRITORIES; THE AMOUNT OF CAPITAL INVESTED, AND THE AMOUNT AUTHORIZED AND INCORPORATED BY STATE LAWS.

State and Territory.	Amount and Value of Dutiable Articles Manufactured.	Capital Invested.	Amount of Capital Authorized and Incorporated by State Laws.
Maine,	$424,648	$439,808	
New Hampshire,	740,894	893,065	$ 2,455,000
Massachusetts,	2,144,816	4,542,325	21,049,000
Rhode Island,	878,558	2,107,222	
Connecticut,	2,429,204	3,144,525	5,540,000
Vermont,	784,349	691,157	
New York,	4,844,387	7,774,049	18,304,000
New Jersey,	919,419	1,725,495	2,360,000

Pennsylvania,	5,049,276	6,323,077	1,115,000
Delaware,	561.500	1,557,296	
Maryland,	1,769,234	5,671,837	4,466,500
Columbia District,	163,046	45,200	
Virginia,	2,708,077	3,138,557	
North Carolina,	473,656	376,508	
South Carolina,	70,922	280,775	
Georgia,	494,752	219,635	
Alabama,	102,311	36,501	
Louisiana,	48,750	33,025	
Tennessee,	1,924,221	976,229	
Kentucky,	2,141,989	2,575,522	
Ohio,	3,134,772	3,955,839	
Indiana,	142,692	150,754	
Illinois,	126,498	74,465	
Missouri,	160,419	41,845	
Michigan Territory,	34,500	60,835	
Arkansas Territory,		1,700	
Total,	$32,271,984	$46,837,266	$55,289,500

The following table shows, probably, a nearer approximation to the actual condition of the cotton manufacture than is furnished by the general aggregates. It exhibits an increase of one hundred and seventy-six per cent., in the whole amount of cotton consumed, and of two hundred and thirteen per cent. in the number of spindles, given in Mr. Gallatin's Report, in 1810, but a decrease of about one hundred and seventy per cent. in the amount of cotton consumed in 1815, according to the report of a Committee of Congress.

STATEMENT OF THE RAW COTTON CONSUMED, AND OF THE NUMBER OF SPINDLES EMPLOYED IN EACH STATE, ACCORDING TO THE FOURTH CENSUS.

States.	Pounds of Cotton Annually Spun.	Number of Spindles.
Maine,	56,500	3,070
New Hampshire,	412,100	13,012
Massachusetts,	1,611,796	30,304
Rhode Island,	1,914,220	63,372
Connecticut,	897,335	29,826
Vermont,	117,250	3,278
New York,	1,412,495	33,160
New Jersey,	648,600	18,124
Pennsylvania,	1,062,753	13,776
Delaware,	423,800	11,784
Maryland,	849,000	20,245
Virginia,	3,000	
North Carolina,	18,000	288
South Carolina,	46,449	588
Kentucky,	360,951	8,097
Ohio,	81,360	1,680
Total,	9,945,609	250,572

Letters patent were granted for the following objects, among others: to Thomas Blanchard, Middlebury, Mass. (Jan. 20), for a machine for turning gun stocks. This was for the celebrated lathe, afterward adapted to turning irregular forms in general, as shoe-lasts, spokes, hat, tackle and wig blocks, etc., for which uses he was granted, by special act of Congress, in June, 1834, and again in 1848, a renewal of his patent, which has just expired (Jan. 1862), the author still living.[1] A. Woolworth, Waterbury county, also took a patent (June 15), for turning gun stocks; I. Kendall, Lincoln, Mass. (Jan. 28), preparing oxymuriate of lime (bleaching powder); A. Buffum and J. Kelly, Westfield, R. I. (Feb. 17), water-proof elastic hats; Robert Eastman and J. Jaquith, Brunswick, Me. (March 16), circular saw for clapboards, etc. This "improved rotary sawing machine" was the first application of the circular saw to the dressing of timber of large size, and the manufacture therefrom of staves, heading, clapboards, etc. One machine was capable of cutting two thousand feet of pine timber per diem. It was in general use throughout New England in 1822.[2] The patent was renewed by act of Congress, for seven years, in March, 1835. Henry and Jacob Day, New York (April 4), improvement in locks; Harvey Hackley, New York (April 21), brewing by steam; Shalor Ives, Chillicothe, Ohio (May 17), machine for spinning candle-wick; Duncan Wright, Medway, Mass. (Aug. 31), drying cloth by steam rollers; William Gilmour, Smithfield, R. I. (Oct. 28), improvement in the Power Loom. The Scotch power loom was first introduced into Rhode Island three or four years before by the patentee. Thomas Rowell, Hartford, Vt. (Nov. 24), making wooden pegs; Jonathan Fish, Medway, Mass. (Dec. 7), for five different improvements on the double speeder for spinning cotton, and one for a combination of these improvements in the double speeder; also to Paul Moody, of Waltham (Dec. 20), for double speeder for roping cotton; George P. Digges, Albermarle, Va. (Dec. 16), making oil from cotton seed; Thomas J. Bond, Baltimore (Dec. 21), iron boats. Improvements in propelling boats and vessels were patented by several persons.

Mr. Jacob Perkins, of Austin Friars, London, late of Philadelphia, and formerly of Newburyport, Mass., was this year awarded, by the London Society of Arts, two large silver medals, for his methods of

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(1) This machine, the idea of which was suggested while operating a lathe, previously constructed for the Government Armory at Springfield, to turn gun barrels complete from end to end, was immediately introduced into the national gun factories at Harper's Ferry and Springfield, where the inventor was employed for five years. He there originated other improvements, and thirteen different machines, afterward generally adopted in the manufacture and stocking of fire arms. The Government allowance of nine cents upon each musket made in the two armories, was the only compensation he received, during the first term of his patent for the lathe, more than fifty of which had, in the mean time, been erected in different parts of the Union, in violation of his right, for turning lasts, spokes, handles, etc. He consequently applied for and obtained a renewal of the patent, as above stated, covering its application to irregular forms in general. For an interesting account of the origin of this and other inventions of the ingenious author, see *Howe's Memoirs of the Most Eminent Mechanics.*

(2) Silliman's Journal, vol. v., p. 154.

warming and ventilating rooms and the holds of ships, and for improvements in engine hose; also its large gold medal for an improved ship's pump, and its smaller or Vulcan gold medal for a method of freeing water wheels from back water. The thanks of the Society were also voted to Perkins, Fairman and Heath, for communicating to the society for publication, certain parts of their *Siderographic* process for multiplying copies of engravings, particularly with a view to the prevention of forgery.[1] The communication, pointing out the greater security and cheapness to be attained in the production of bank notes, and copies of engravings or illustrated works, requiring numerous impressions, and in the manufacture of printed calicoes, ribbons, earthenware, etc., by Perkins's method of decarbonating and hardening steel plates, etc., and the process of transferring, retransferring, and multiplying impressions and patterns, by aid of the geometrical lathe, invented by Mr. Asa Spencer, of Connecticut, accompanied by specimens of the art, together with accounts of the other inventions of Mr. Perkins, above named, will be found in the thirty-eighth volume of the Society's Transactions. In the thirty-ninth volume, for 1821, are also engravings and descriptions of an improvement in the warming and ventilating stove, for which Mr. Perkins received the thanks of the Society, and also of two instruments for ascertaining the trim of a ship more accurately than by the methods usually practiced, for which he was rewarded with the Vulcan gold medal. One of the instruments was designed to be placed in a line with the keel of the ship, and therefore denominated by him the *orthometer;* the other, placed at right angles to the keel, was called the *pleometer,* and the change in the relative positions of their indexes, showed when the vessel was in a proper trim for sailing.

The failure of the tariff bill, in the early part of the last year, was followed, in the next session, by several remonstrances against a renewal of the measure or any farther extension of the restrictive system, as destructive to revenue and to the interests of agriculture and commerce. The merchants and citizens of Petersburg, Va.; the commercial and agricultural citizens of Maine—recently admitted as a state; a convention of delegates representing the merchants and others interested in commerce, assembled at Philadelphia; the citizens of Charleston, S. C.; the delegates of the United Agricultural Societies of Virginia, in a

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(1) Messrs. Murray, Fairman & Co., of Philadelphia, associates of the London firm, produced in this, or early in the following year, beautiful specimens of bank notes, showing all the improvements in the art of engraving, in part executed by very costly machinery, and of unrivalled excellence. They were in all respects equal to the specimens executed in London.

second petition, and the Roanoke Agricultural Society of Virginia, severally preferred their memorials. The proposed increase of duties and the whole system of bounties, premiums, prohibitory duties, or other enactments tending to limit the freedom of trade for the encouragement of manufactures, were deprecated with earnestness and ability, as calculated to embarrass the public finances, and promote smuggling; as partial and exclusive in their effects; as taxing the many for the benefit of a few; fostering single or local interests at the expense of every other, and as calculated to assimilate the national economy to the worst features of the European systems. The encouragement of manufactures by legislative interference, was denounced as alike impolitic and unjust. The auctioneers also petitioned against a duty on sales at auction, insisting upon the advantages of the system to the community in general, and particularly to the manufacturers, to the smaller of whom, the auction was almost exclusively the medium of sale for his goods, which, in their own state, were exempted from duty by the Legislature.

Petitions were also laid before the House by the inhabitants of Belfast, Maine, and by the merchants and others of Richmond, Virginia, the former attributing to the tariff and cash payment bills repealed at the last session, a purpose to abolish the system of debentures and drawbacks, and depicting their ruinous effects upon commerce; and the latter imputing to the advocates of manufactures, less of a desire to promote internal manufactures than of enmity to foreign commerce and navigation, which it was their design in these bills to assail and eventually to destroy. These petitions were the subject of a report presented early in the session, by Mr. Baldwin, from the Committee of Manufactures, disclaiming any such objects in the bills or in their framers, and strongly rebuking misrepresentations and imputations so improper and unusual in reference to acts of the National Legislature.

The same Committee, on the 15th January, reported a new bill and accompanied it by a report of more than ordinary length and ability, in which the subjects of the various memorials, just referred to, were elaborately discussed, and the views of the Committee fully and freely stated.

An opposite view of this important question was also presented, at considerable length, on the 2d February, by the newly created Committee of Agriculture, to whom the second memorial of the United Agricultural Societies of Virginia had been referred.

The bill received some amendments, but was not called up for a third reading, either in consequence of its late introduction, or the strength of the opposition, a motion made four days before the close of the session, to go into consideration of the tariff and auction bills, having been negatived by a vote of sixty-two to fifty-three.

It does not appear that any great effort was made by the manufacturers generally to secure the passage of an act supposed to be exclusively for their benefit, although Mr. Carey, with his usual activity, issued, during the year, an address to the farmers of the United States, showing their interests to be involved in a change of policy, and also a review of a pamphlet on the tariff by Mr. Cambreleng, a prominent merchant and member of Congress, from New York, whose representations of the general prosperity of the country, and of the effects of a protecting system, were singularly at variance with the report of the Committee. For these and other services, the citizens of Wilmington, Del., in public meeting, voted Mr. Carey a piece of plate of the value of one hundred and eighty or two hundred dollars, subscribed by employers and operatives, which was presented in April, with an inscription expressive of their gratitude.[1]

The cotton crop of the United States, according to official tables, was this year about thirteen millions of pounds in excess of any previous year, and amounted to one hundred and eighty millions of pounds, being 28.5 per cent. of the whole quantity grown throughout the world, which was estimated to be six hundred and thirty millions of pounds. The quantity exported was one hundred and twenty-four millions of pounds, worth twenty millions of dollars, at the average price of sixteen cents per pound. The quantity manufactured in the United States was estimated at twenty millions of pounds.[2]

The cotton manufacture, offered at this time the most eligible investments of capital, and the success of the Waltham Manufacturing Company, which was the most extensive in the Union, and was said to have divided twelve per cent. upon its capital, during a period of general depression, induced others to engage in it. Messrs. P. T. Jackson and Nathan Appleton, principal owners in the Waltham factory, having instituted inquiries for a suitable water power, with the design of introducing the manufacture and printing of Calicoes on large scale, were directed to the Pawtucket Falls, in East Chelmsford, now Lowell, which they visited in September. In connection with Mr. Kirk Boot, they made, during the next month, the first purchase of lands, on the present site of Lowell, from the Pawtucket Canal Company, and other proprietors of the territory, which then contained less than two hundred inhabitants. Articles of association were signed on 1st December, and an act of incorporation was obtained on 5th February, 1822, under the name of The Merrimac Manufacturing Company, with a capital stock of six hundred shares, owned as follows: N. Appleton and P. T. Jackson, each one hundred and eighty shares; Kirk Boot and John W. Boot, each ninety shares; Paul Moody, sixty shares. The following persons were permitted, at the next meeting, to subscribe to the amount of ninety-five shares, viz: Dudley A. Tyng, Warren Dutton, Timothy Wiggin, William Appleton, Eben. Appleton, Thomas W. Clark, D. Webster, Benjamin Gorham, Nathaniel Bowditch. The original shareholders also sold one hundred and fifty shares to the Boston Manufacturing Company, at an advance of ten per cent. Mr. Boot was elected treasurer and agent, and acted in the latter capacity until his death, in 1837. The corporation, early in the ensuing spring, proceeded to make additional purchases, toward acquiring control of the entire power of the Merrimac at that place, and to enlarge and extend the canal and locks sufficiently for fifty mill powers, at a cost of $120,000. They arranged, with the Waltham Company, for the transfer, for the sum of $75,000, of the patterns and patent rights of machinery, and of the services of Mr. Moody, and erected the first mill, a church, etc. The first wheel was started in September, 1823, and the capital was, the same year, increased to $1,200,000. In 1825, the first dividend of one hundred and sixty per share was made, at which time three additional mills were built, and five hundred dollars were appropriated for a library, and operations were commenced by the Hamilton Manufacturing Company. The original Company has continued, with few intermissions, to divide about twelve per cent. annually, to the present time. The Company commenced print works on a large scale, in 1823, but were anticipated by establishments at Taunton, Mass., and Dover, N. H.

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[1] "A tribute of gratitude to Matthew Carey, Esq., in approbation of his writings on Political Economy, presented by some of the friends of National Industry, in Wilmington, Del., and its vicinity, April, 1821."

[2] Secretary Woodbury's Report.

The Great Falls Manufacturing Company was incorporated this year, by the States of Maine and New Hampshire, with a capital of $400,000, to erect works on the Salmon Falls, or Piscataqua river, which divides the states. The mills were built at Great Falls, now the beautiful manufacturing town of Somersworth, on the New Hampshire side, then containing only one house and a saw mill. Within ten years from this date, the place contained about two thousand inhabitants, and four large cotton mills, with 31,000 spindles, and a woolen mill, said to be the largest in America, two hundred and twenty feet long, six stories high, and having machinery for making 120,000 to 130,000 yards of fine broadcloth yearly, and a large carpet factory attached, capable of making 150,000 yards of best ingrain carpeting.

About four thousand looms were put in operation, in Philadelphia, in the first six months of this year, chiefly for weaving cotton goods. Calicoes of firm and fine texture were made and printed in Philadelphia, and sold as low as the poorer qualities of British calicoes. Preparations were made to carry on the business extensively, both by water and steam power. Domestic cottons had, at this time, in a great measure superseded the coarse plain cottons from abroad.

Money continued to be invested in woolen manufactures, and considerable quantities of Spanish wool were imported from Bilboa, and met with ready sale, the domestic supply of wool being then, as now, inadequate to the demand.

Mr. Macauley, the proprietor of a manufactory of woolen carpet, patent floor cloth, and oil cloth, which last were now made in different parts of the Union, contracted to supply a large quantity of ingrain carpeting, of his own make, to the new State House at Harrisburg.

The Wolcott Woolen Manufactory, at South Bridge, Massachusetts, was incorporated, with a capital of $144,000, for the manufacture of broadcloths and cassimeres, with thirty-two looms and other machinery valued at $40,000, but sunk, during the next five years, upward of $23,000. Boston was, at this time, the market for large supplies of domestic cloths, which were sought after, and the demand for wool was increasing.

A manufacturer of power looms, who made about seventy per week, was unable to supply the demand.

An extensive steam mill was erected at Bath, in the State of Maine. The Copperas works, at Strafford, Vermont, produced about one hundred tons per annum, by the labor of four men. A manufactory of Alum was in successful operation at Salem, Massachusetts, and sulphate of copper (blue vitriol) was also made there, of superior quality, presenting crystals of extreme beauty.

The fifth annual message of President Monroe, read December 3d, held out the encouraging prospect, that, under the protection given to domestic manufactures by existing laws, the United States would become, at no distant period, a manufacturing country on a large scale. The resources of the country, in raw materials, food, mechanical skill, and improvements calculated to lessen the demand and cost for labor, would, under present duties, make our industry equal to any demand which, under a fair competition, could be made upon it. In proportion to our resources, and independence of foreign powers, would be the stability of the public happiness, and, with the increase of domestic manufactures and the demand for raw materials, the mutual dependence of the several parts of the Union, and the strength of the Union itself, would be proportionately augmented.

Miss Sophia Woodhouse (afterward Mrs. Wells), the daughter of a farmer residing at Weathersfield, Conn., in the early part of this year, sent, to the London Society of Arts, samples, in their raw, bleached, and manufactured states, of a new material for Straw Plait, consisting of a

Bonnet made in imitation of Leghorn, and dried specimens of the grass from which it was made, popularly known there as *ticklemoth*, a species of (*poa pretensis*), spear grass, or smooth stalked meadow grass, growing spontaneously in that port of the country. The Weathersfield bonnet was pronounced, by the principal dealers in London, superior in fineness and beauty of color to the best Leghorn, and the cultivation or importation of the straw was recommended as a means of supplying raw material of superior quality. The Society, at its next session, voted the large silver medal, and twenty guineas, to Miss Woodhouse, on conditions which would put the Society in possession of some of the seed, and the process of bleaching, which were sent by her with a description of the whole treatment of the culm, and a certificate that she was the original inventor of the art.[1] A patent was granted, in the United States, Dec. 25, to Garden Wells and Sophia Wells, of Weathersford, for making hats and bonnets of grass, in the manner above mentioned.

The Misses Burnap, of Merrimac, N. H., also claimed, not far from this time, the first discovery, in that region, of the manufacture of Leghorn bonnets. A grass bonnet of their manufacture sold this year, in Boston, at auction, for fifty dollars. In consequence of the high price of Leghorn hats and bonnets at this time, the manufacture had been commenced in a number of places, and many specimens rivalled, if they did not surpass the Italian. The importation of common straw hats had been long stopped by the domestic manufacture in Massachusetts, Connecticut, and elsewhere. Premiums as high as twenty dollars each were offered in New York for the finest specimens of bonnets, and the complete establishment of the business, it was thought, would soon be a saving of two millions of dollars annually to the country, and furnish an article for exportation.

PATENTS.—Paul Moody, Boston (Jan. 17), for frames for spinning cotton; to the same (Feb. 19), two patents for roping or spinning cotton, one being the double speeder. These and other improvements of Mr. Moody were introduced into the new factories at Waltham and Lowell, and aided in establishing the cotton manufacture in the United States, upon an improved and permanent basis. John Brown, Providence, R. I. (Jan. 23), for spinning and roping cotton and wool by hand; the same (Aug. 11), for a vertical spinner; George J. Newbury, New York (Feb. 1), printing with metallic and colored powder (bronzing); A. O. Stansbury, New York (April 7), and Samuel Rust, New York (May 13), improvements in the printing press. Mr. Rust's invention was known as the Washington press, which for some time was made by Rust &

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(1) Trans. Soc. Arts, vol. 40., pp. 217-222.

Turney, afterward by Messrs. R. Hoe & Co., of New York, by whom they were greatly improved. Five different improvements in the cast iron plough were patented by inhabitants of New York State. Minus Ward, Columbia, S. C. (March 22), improvement in steam engines. This was for an alternating or rotary engine, which enabled the piston rod to describe a rotary motion upon its extreme end, when turning a wheel. Ross Winans, New York (June 26), fulling cloth by steam; Josiah Chapman, Frankford, Pa. (July 9), sail duck loom. Sail cloth, made by the improved method of the patentee, at Frankford, was tried on the boxer, in 1815, by Captain Porter, and was found superior to English or Russian, having twice the durability in hard service. James Richards, Paterson, N. J. (Aug. 10), sail cloth loom; Isaiah Jennings, New York (Sept. 22), repeating rifles; John Cook, Fayetteville, N. C. (Oct. 12), machine for packing cotton; Charles Williams, Boston, improvement in railways. The patentee, in a communication to the Richmond Whig, dated Fluvanna county, Virginia, December 13, 1845, claimed to have invented, in 1817, a wooden railway, to remove dirt, and during this and the following year to have planned a small engine, in Boston, to use steam, and therefore to have been the first to apply steam to railroads, the first locomotive of Stephens having been copied from his invention.[1]

1822 The seventeenth Congress was memorialized during its first session, by Mr. Jefferson, the rector, and the visitors of the University of Virginia, and by the trustees of the Transylvania University, for a repeal of the duty on books imported into the United States, as being an obstruction to the progress of science, literature, and general improvement. The Senate Committee on Finance, on 8th January, made a report adverse to the prayer of the trustees, because, by the tariff of April, 1816, philosophical apparatus, instruments, *books*, maps, statues, and other articles imported for the use of any society incorporated for philosophical or literary purposes, or for the encouragement of the fine arts, or by order and for the use of any seminary of learning, were exempt from duty. The interests of authors, publishers, paper and type makers, and of the revenue, forbade an exception, principally for the benefit of professional gentlemen or scholars of wealth and leisure, who might wish to obtain rare or elegant and expensive editions of foreign authors. On ordinary or cheap editions of English works for general circulation, the export bounty of three pence per pound weight, allowed in Great Britain, nearly balanced the American import duty of fifteen per cent.

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(1) See Merchant's Magazine, vol. 14. p. 249.

ad valorem. It was, moreover, desirable that we should have American editions, adapted to our exigencies and tastes and less productive of foreign influence.

The subject of Protection to manufactures, which had strongly agitated the country for four or five years, was, on the following day, once more brought up in the House by a bill reported so late in the Session, that, after having been twice read and amended, the House, by a vote of sixty-two to fifty-three, refused to go into committee for the final consideration of that and the Auction Bill, and a new one was reported to the next Congress. Mr. Baldwin's bill proposed a very considerable increase in the rates of duty, and the substitution of specific rates on a large number of articles.

The Senate Committee on Commerce and Manufactures, instructed to inquire into the expediency of prohibiting the importation of foreign distilled spirits, reported toward the close of the session, that although agriculture and manufactures, and in a short time the revenue, would be benefited by the prohibition, its immediate effects would be injurious to the commercial interests of the United States, and would diminish the revenue, before an excise system could be brought into operation. They recommended, in preference, a gradual increase of duties to the extent of prohibition, for which purpose a bill must originate in the House as a revenue measure. Mr. Baldwin's tariff bill proposed to raise the duties on cottons and woolens, only eight and one third, and on iron, steel, copper, brass, and lead, five per cent., making them thirty-three and one third per cent. on the former and twenty-five on the latter.

The cotton crop of the United States amounted, this year, to 210,000,000 pounds or thirty millions of pounds more than that of 1821. The quantity exported was about 144,700,000 pounds, or nearly twenty millions of pounds more than in the last year. The heavy importations of the two years caused a reduction of the price in England, to an average, on the whole year, of eight and a quarter cents per pound. Some prime lots, which early in the season cost, in Charleston, eighteen and a half cents, sold in November for eight and a half pence, equivalent, with exchange at eleven per cent., to twelve and a half cents a pound. The average price of Upland cotton, toward the end of August, was as low as six and a half pence in Liverpool, or about nine and a quarter cents with exchange as above. The loss to shippers of cotton, was from twenty-five to thirty-three per cent., and was estimated to amount, on the exports of the whole year, to between four and five millions of dollars. The first cotton from Egypt was received at Liverpool the ensuing year.

The cotton culture was first commenced, this year, in Texas, by

Colonel Jared E. Groce, in the bottoms of the Brazos de Dios, where the first colony from the United States was planted in the last year, by General Stephen F. Austin,' the father-in-law of Col. Groce. On the plantation of the latter the first cotton gin in Austin's Colony, and the second in the state, was erected in 1825, the first having been built by Mr. John Cartwright, of the Redlands.[1]

The most extensive Cotton pressing and Tobacco warehouse, at this time, in New Orleans, was that of Mr. V. Rillieux, and was furnished with three presses, with steam, water, and horse powers, and a fire engine. It was capable of containing eleven hundred and fifty bales of cotton, and cost $150,000.

The manufacture of Cotton Sail Duck was commenced in February of this year, at Patterson, N. J., by Mr. John Colt, who employed hand looms, and made it wholly of double and twisted yarn, without starch or dressing. In March, 1824, up to which time he had made only about five hundred pieces, Mr. Colt introduced the power loom, which had been used for several years by Mr. Bemis, the original manufacturer of the article. The business was from that time rapidly improved and extended by Mr. Colt, who, in 1831, made 460,000 yards, which quantity he has since more than doubled. His sail duck has always been in high repute. Two duck factories at Paterson, in 1823, owned by Mr. Colt and Mr. Travers, with fourteen hundred and thirty-three spindles and one hundred hand looms, consumed upward of a ton of flax daily, and in a great measure supplied the United States Navy with canvas. There were, at the same time, twelve cotton mills, with 17,724 spindles and one hundred and sixty-five power looms; three extensive woolen factories; three machine factories, one of which, Goodwin, Rogers & Co., was said to be the most extensive and complete in the United States, employing sixty-six hands; three extensive bleach greens; two brass and iron foundries, saw and grist mills, paper mill, rolling and slitting mill, nail factory, and reed factory. During the same year, cotton duck began to be made in Baltimore, by Charles Crook Jr. and Brother, who made from forty to sixty bolts per week, thirty-six yards in length by twenty inches wide, weighing forty pounds to the bolt. It was fifty per cent. stronger than required by the standard of the navy board, but the manufacturers were ruined by the enterprise, although it has since become a prosperous manufacture in Baltimore.

The cotton manufactory at Waltham, Mass., made, at this time, thirty-five thousand yards of cloth weekly, or about 1,820,000 yards in a year. It employed about five hundred operatives, nearly all of them Ameri-

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(1) De Bow's Review, vol. 14., p. 74.

cans. The sheetings and shirtings, or domestics, as they began to be called, a quality of goods which originated with this factory, were becoming quite popular in all parts of the Union, and in foreign markets. Considerable quantities were already exported yearly to South America, where they were in much demand. Negro cloths of cotton and wool, also an American fabric, were fast superseding British cloth, as an article of clothing for slaves.

The first cotton mill at Lowell commenced the manufacture of calicoes this year, and propositions were made for the erection of a second factory. The second cotton mill in North Carolina, was erected at Lincolnton.

Messrs. David H. Mason and Matthew W. Baldwin, manufacturers of improved bookbinders' tools, in Philadelphia, commenced, about this date, the first engraving of Cylinders for calico printing in the United States. The establishment of print works on a large scale, at Taunton and Fall River and Lowell, Mass., Dover, N. H., at Baltimore, Columbiaville, N. Y., and elsewhere, within a few years, gave them a prosperous business, in which their numerous improvements enabled them to compete successfully with foreign artists. The invention and manufacture of tools and machinery adapted to their use, some of which were patented this year, led to the construction of calico printing machines, drying and calendering machines, for cotton, silk, or paper, drop and seal presses, engravers' machines, stationary engines and machinery in general, which was carried on at 14 Minor street. This business was soon followed by the construction of locomotives for railroads, of which Mr. Baldwin was one of the first, as he is now one of the most extensive builders in the United States.

Steam power was this year first introduced in the Sugar manufacture of Louisiana, which produced, at this time, about thirty thousand hogsheads, and in the next ten years, increased it to seventy thousand hogsheads. The first Steam Sugar mills and engines, were chiefly imported by Gordon & Forstall, and cost about $12,000. The use of steam did not become general until our own foundries had reduced the price to five or six thousand dollars.

The Bituminous Coal Basin of Richmond, or Chesterfield, Virginia, containing the oldest wrought collieries in America, and for many years the only domestic source for that species of fuel, produced this year, for exportation, forty-eight thousand tons, which was increased, in 1833, to 142,000 tons; from which the supply annually declined to sixty-five thousand tons in 1842.

The Iron Manufacture of the United States was much prostrated at this time. The importation of all kinds of iron this year, from Great Britain, was 15,000 tons, against 6,000 tons in the last year. The highest price of bar iron in the United States, from June, 1820, to July, 1824, was forty-six dollars, and the average about forty-two dollars per ton.

Among the iron works in operation, were two in Brandon, Vermont. One of these, owned by Mr. Roger Fuller, made thirty-six tons of bar iron annually, and also a very superior quality of shovels, said to be better and tougher than those imported from England. Mr. Conant's works, recently put in operation, made cast iron from the same ore. Castings, said to be the best in the country, were made by him to the amount of one hundred tons annually, and included Conant & Broughton's improved Cooking Stoves, patented the next year, which were so popular that the demand much exceeded the supply.

The first extensive or successful use of iron Conduit Pipes, in the United States, was made about this time in the service of the Fairmount Water Works, erecting in Philadelphia. They were cast in that city in sections of nine feet in length, and two to twenty-two inches diameter, upon the plan furnished by Mr. Walker, engineer of the New River water works, near London, where cast iron water pipes were in successful use. About 30,000 feet of pipe, and three to four thousand joints of peculiar construction had been laid, and the Schuylkill water was introduced into 3,945 private dwellings, 185 manufactories, and 401 private baths, in the city.

Elastic tubes or pipes of caoutchouc or India Rubber, for gaseous fluids, were made and used during this year by Thomas Skidmore, of New York, by a process devised by himself.[1]

Samples of white Flannel, made in the state of New York, sold in Charleston for one dollar a yard, and was considered equal to the best Welsh flannel.

Water-proof cloth, made by dissolving caoutchouc in petroleum (coal oil), and cementing the surfaces of two pieces of cloth by means of the solution, and then passing it between rollers, began about this time to be made in Glasgow, by Mr. McIntosh, the inventor of the process.[2] India rubber overshoes first began about this time to be imported into the United States.

The boldest enterprise yet attempted in the way of publishing in the

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(1) Silliman's Journal, vol. 5, p. 153.

(2) In the second volume of the *Bee* or *Literary Weekly Intelligencer*, published in Edinburg, in 1791, is an account of the manner of obtaining and manufacture of elastic gum, or caoutchouc—then only used for erasing pencil marks, whence it derived the name of India Rubber—and suggested the numerous uses to which it might be put in the arts and manufactures, in which many of the present applications of that important material were recommended and foretold. The first patent for its application in the arts in England, was given, we believe, to Charles Baganelle Fleetwood, in 1824, "For a liquid and composition for rendering leather water-proof," (by dissolving caoutchouc in spirits with beeswax, etc.)

United States, was the completion at Philadelphia, during this year, of an American edition of Rees's Cyclopedia, revised, corrected, enlarged, and adapted to this country. It was in forty-one volumes, quarto, with six additional volumes of plates, containing 147 highly finished engravings. It consumed in the printing 30,000 reams of paper, and was the largest work in the English language.

The paper-makers, printers, and booksellers, who united to memorialize Congress against a reduction of the duty on imported books, stated that the cash value of books manufactured annually in Philadelphia was considerably more than one million of dollars, and every article used in the business was made at home.

An extensive paper mill on Bronx river, New York, was destroyed by fire, with its machinery and stock, and one of the large paper mills of the Gilpins, on the Brandywine, was carried away by a flood of great violence, reducing to a mass of ruins the first cylinder paper machine constructed in this country, the invention and improvement of which had cost Mr. Gilpin years of labor and expense.

A company was incorporated for the erection of a Shot Tower, in Baltimore, on the west side of North Gay street. It was 160 feet high, and built by Jacob Wolfe, under the direction of Col. Joseph Jamieson, president of the company.

Mr. Creswick, of New York, contracted to supply the United States Navy with Brass Buttons, which he struck off at the rate of nearly two dozen in a minute by a newly invented stamping machine, said to be the only one in America.

In nine years, since the enrolment and license of the first steamboat employed in trade on the Mississippi, there were eighty-nine boats enrolled at the port of New Orleans, with an aggregate admeasurement exceeding 18,000 tons. The whole number built on the Western waters, up to the end of this year, was 108, of which number ten were built this year, and seven in the last.

PATENTS.—A. C. Baker and M. F. Biddle, Albany, N. Y. (Feb. 7), transferring impressions from paper to wood; C. M. Graham, New York (March 9), artificial teeth, the first for that object; Wm. Hall, Boston (March 23), and Joseph Hastings, Cambridge, Mass. (Aug. 14), making isinglass or icthyocolla. This manufacture was thought to have been brought to great perfection by Mr. Hall, his isinglass being considered far superior to any imported. Robert Moore, Rowan county, N. C. (March 19), a mode of delaying buds from blossoming; George Murray, (March 23), and James Puglia, (Aug. 13), both of Philadelphia, making bank notes; Reuben Hyde, Winchester, Mass. (April 19), machine for making pales for fencing; B. and J.

Tyler, and J. B. Andrews, Windsor, Vt. (April 23), a threshing machine. This mill, invented two or three years before, was moved by two horses, and with a driver and four men would thresh and clean about twenty-five bushels of wheat in an hour; water and steam power could be used, and it would thresh cloverseed, rice or coffee, with equal success. John Ames, Springfield, Mass. (May 14), machine for making paper; Joshua Shaw, Philadelphia, (June 19), improvement in percussion guns;[1] John Rogers, Washington, D. C. (June 24), marine railway. This invention of Capt. Rodgers, President of the Navy Board, was the subject of a special message to Congress from the President, accompanied by a letter and description of the "inclined plane" dock and fixtures for hauling up ships, with estimates of cost, etc., and the committee to whom the documents were referred, reported a resolution to appropriate $50,000 for a dock, wharves, etc., at the Navy Yard, Washington. Eli Terry, Plymouth, Conn. (May 26), wooden wheel clocks; Moses Pennock, East Marlborough, Pa. (June 26), horse hayrake; James McDonald, New York (Aug. 31), flax and hemp machine. This machine, for breaking and cleaning unrotted hemp or flax by one horse power, with a man and three boys to attend it, would clean from 1,600 to 2,000 lbs. in a day, yielding 400 to 500 lbs. when bleached. By attaching another machine, and adding another man and boy, it could clean with the same power 800 to 1000 lbs. of bleached fibre, at a cost of $5 per diem. Peter Force, Washington, D. C. (Aug. 22), printing paper hangings; N. Wright, Onondaga, N. Y. (Oct. 3), machinery for cooper's work. A cooper's ware factory employing this patent machinery, and a capital of $3,000 and six hands, was in opera-

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(1) The invention of the percussion lock and cap has been ascribed to Mr. Shaw, some of whose patented improvements in percussion guns, pistols, and cannon, including the wafer primer for percussion cannon, were tested and approved by the United States government, from which he received $18,000 out of $25,000 granted him by Congress, in 1848, for the use of his patents, although he is said to have been entitled to, or claimed $170,000. He was a man of great ingenuity, and a native of Lincolnshire, England, whence he came to Philadelphia, in 1817, bringing with him, as a present to the Pennsylvania Hospital, from his friend Benjamin West, the American painter, the artist's great picture of "Christ Healing the Sick." He died at Burlington, N. J., in September, 1860, aged 83. The invention of percussion fire arms has been claimed by different persons. The London Society of Arts, in 1818, voted Mr. Collinson Hall, of Mary-le-bone, a silver medal for a percussion gun lock, described in the 36th volume of the Transactions for that year, and in 1825, presented the gold Vulcan medal to Capt. T. Dickinson, of the Royal Navy, for the application of percussion powder by means of caps, to naval ordnance.—See Trans., vol. 43, p. 109, etc. Napoleon III. has also conferred a pension of six thousand francs upon Capt. Delvigne, as the inventor of the percussion lock. The first use of fulminating powder in guns adapted to its use, has also been ascribed to M. Beringer, in France.

tion at Onondaga, and was said to give a net profit of forty per cent., at wholesale prices, on the capital every time it was turned over, which could be done several times in the year. E. Heald, Norridgework, Me. (Dec. 4), machine for shearing cloth. Heald & Howard's patent cloth shearing machines were calculated to shear *two* pieces at one operation, and were made in Philadelphia, in 1828, by Benj. F. Pomroy. Christopher Cornelius, Philadelphia (Dec. 28), light-house lamps. Cornelius's Lamps for burning lard were on the solar principle of the Argand lamp, and were of great illuminating power, as shown by tests made under direction of the Treasury Department.

The subject of a revision of the tariff, with a view to the protection of domestic industry, continued to be one of paramount interest to the **1823** whole country. The sixth annual message of President Monroe to Congress, on 3d December last, adverted to the subject in these terms: "Satisfied I am, whatever may be the abstract doctrine in favor of unrestricted commerce (provided all nations would concur in it, and it was not likely to be interrupted by war, which has never occurred and cannot be expected), that there are other strong reasons applicable to our situation, and relations with other countries, which impose on us obligations to cherish our manufactures."

On the 9th January, Mr. Tod, of Pennsylvania, from the Committee on Manufactures, to whom this passage of the executive speech had been referred, along with sundry memorials, reported a bill for the more effectual encouragement and protection of certain domestic manufactures, which was read twice and committed to the Committee of the Whole on the State of the Union. It proposed to add five per cent. to the existing duties on woolen goods, making them thirty per cent. ad valorem, and estimating them at the minimum price of eighty cents per square yard, except blankets, flannels, and worsted or stuff goods, making the duty virtually prohibitory on all coarse woolens, but the most necessary ones. The duty on cottons was left as before, but a minimum price of thirty-five cents per square yard on checked and striped cloths, was proposed in part with the view of preventing foreign manufacturers from defrauding and discrediting American factories, by palming off worthless counterfeits of American cottons. On silk, linen, and hempen goods, the duty was increased to twenty-five per cent., and the minimum valuation of twenty-five cents a yard on the last two was established as on cottons. On Leghorn and silk hats an increase of one third was proposed, making the duty forty per cent., with a minimum price of one dollar. On hammered bar iron an addition of five dollars per ton was proposed, leaving rolled iron as before. On lead, hemp, nails, glass, and many other articles, an increase of duties, and change from ad valorem to specific rates were contemplated by the bill.

It was called up on 29th January, and Mr. Tod, in explaining its principles, stated the amount paid or due to foreign nations for manufactures of wool, cotton, linen, hemp, iron, lead, glass and earthenware imported in the last two years, was $55,453,951 (of which woolens formed over $19,000,000, and and cottons nearly $17,750,000). The annual average was $27,726,975, exclusive of all re-exportations, and exceeded, by above $8,000,000, the yearly expenses of the government and the interest of the national debt.

While such was the state of the import trade, foreign nations refused to reciprocate by taking American flour and provisions on like terms, in part payment. The grain-producing capacities of the country had been increased by new accessions of territory and internal improvements, from four to sixfold, since 1790; but the annual exports of flour, beef, and pork, etc., were only about equal to the average of the five years from 1790–94. As to the oft-repeated objection that duties on foreign manufactures enhanced the price to the consumer, a sufficient answer was furnished in the case of coarse cottons. These were supplied better and cheaper, by our own workmen, than the imported goods; yet these were the only articles legally protected by a prohibitory duty, like those of other nations. These were, moreover, the very articles, the duty on which had constantly been made, by the adversaries of protection, the theme of complaint as an instance of pernicious and oppressive legislation, as in the Salem memorial, and that of the United Agricultural Societies of Virginia.

The bill had not, therefore, been framed solely nor chiefly for the benefit of the manufacturer. If protection now enabled the poor man and the farmer to obtain coarse cottons at a price, considering the quality, one half (he would say one third) that formerly paid for the imported article—as it was notorious he could do—the same effect might be expected to follow the exclusion of other articles, with the further advantage of having constant employment for his family, or a market for his produce if living near a factory. Mr. Holcombe, from New Jersey, who ably supported the bill, remarked that the manufacturing question was very different from what it was ten years before. It was no longer whether we could manufacture any article as profitably as we could purchase it, but whether, by additional protection, we could not sell profitably abroad as well as supply the domestic market.

The bill was strongly opposed by most of the members from the planting districts, and by several from the commercial and manufacturing towns of the north; among whom, were prominent Messrs. Cambreleng, of New York, Tatnall, of Georgia, Gorham, of Massachusetts, Durfee, of Rhode Island, and others, some of whom used very strong language and even threatened or counselled resistance. It was supported with energy by Messrs. Tod, Holcombe, of New Jersey, Mallary, of Vermont, Eustis, of Massachusetts, and many others. Having been warmly debated for several days, Mr. Tod, on 14th February, made a motion, with a view of having the bill brought directly before the House for final action, which produced much excitement; after which it was laid aside for other business and was not again considered during the session.

The revenue laws were amended by an act, approved March 1, decreeing that no goods imported, subject to ad valorem duties, should be admitted to entry, unless the true invoice was produced, excepting goods from a wreck.

By an act of the same date, United States ports were opened to British vessels from colonial ports in America.

On the third March, the act of 15th May, 1820, imposing a tonnage duty on French ships, was repealed, and a discriminating duty of two dollars and seventy-five cents per ton on French goods imported on French bottoms was laid, and after two years was to be diminished one fourth annually.

An act of the same date, to establish a National Foundry on the Western waters, appropriated $5,000 for the employment of engineers and others, under the direction of the President, to examine and report, on the most suitable site, the cost of erection, etc.

The report of the commissioners, made at the next session, in conformity with the last mentioned act, described three localities on the waters of western Pennsylvania, and made the following estimate of the cost of steam power, etc., at Pittsburg, for such an establishment, one of the proposed sites being near that town. The total annual cost for four steam engines, working three hundred and thirteen days, would amount, for one hundred and sixty bushels coal per diem, at three cents a bushel, for oil, and four packings each, and for the wages of four engineers, at $400 each, to $3,225.60. It also stated that there were employed in Pittsburg at this time fourteen engines, from twenty to eighty horse power each, whose united power exceeded that of the whole extent of the Muskingum river, with a head of eight feet.

With the general revival of business, about this time, the building of Steamboats was resumed at Marietta, by James Whitney and others, who, in the next fifteen years, built about forty boats. The business also received a new impulse in other river towns, among which Pittsburg and Cincinnati took the lead. At Pittsburg, seven boats, measuring together about nine hundred and sixty tons; and at Cincinnati four boats, whose tonnage was seven hundred and ninety, were built in this year; and four others at Steubenville, Marietta, and Louisville.

A stern wheel boat, the Virginia, first ascended the Mississippi by steam, as far as Fort Snelling, in May of this year.

The progress of steam navigation on the Western rivers had already effected a great saving in the time and cost of travel and transportation.

The average time and rates of passage between certain ports were as follows: New Orleans to Cincinnati, a distance of fourteen hundred and eighty miles, sixteen days, fare fifty dollars, down passage eight days, twenty-five dollars; Louisville to Cincinnati, one hundred and thirty miles, thirty hours, six dollars; downward, fifteen hours, four dollars; Cincinnati to Pittsburg, four hundred and forty-nine miles, five days, fifteen dollars; downward, sixty hours, twelve dollars.

During the year, 68,932 tons of merchandise, valued at $3,590,000, exclusive of iron castings, salt, gunpowder, white lead, and other manufactures not estimated, descended the falls of the Ohio at Louisville. It was the growth and manufacture of 1822, and came from all parts of Ohio, except the lake border, from two thirds of Kentucky, one half of Indiana, and small portions of western Pennsylvania and Virginia. The value of produce and manufactures shipped from Cincinnati and its immediate vicinity, in the year ending in April, was estimated at over $1,000,000, and included types and printing material worth $10,000, paper $15,000, cabinet furniture $20,000, chairs $6,000, hats $6,500.[1]

The first Railway Act in America was passed 31st March, by the General Assembly of Pennsylvania, to incorporate a company to erect a railroad from Philadelphia to Columbia, in Lancaster county, under the name of "the President and Directors of the Pennsylvania Railroad Company," the stock of which was limited to six thousand shares, of one hundred dollars each. The act was passed, as the preamble declares, in consequence of the memorial of John Stevens and his associates, which stated that it would facilitate transportation, and that Mr. Stevens had made important improvements in the construction of railways. The road was to be built under his superintendence, but this first link in the great chain of communication with the west was finally completed by the state.[2] During this year also, the Champlain Canal, connecting the

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(1) Niles's Register, vol. 25, p. 95.

(2) Mr. Stevens and his partners in the enterprise, having failed to carry out their design, the act was repealed April 7, 1826, by an "act to incorporate the Columbia, Lancaster, and Philadelphia Railroad Company," and on 28th March, 1828, the Legislature authorized its construction, at the expense of the commonwealth. It was soon after located, and begun the next year, and completed from Philadelphia to Columbia, eighty-one and a half miles, in October, 1834. The Danville and Pottsville Railroad Company was also chartered 8th April, 1826.

Hudson river at Albany with Lake Champlain, and the first portion of the great system of internal navigation, between New York and the basins of the St. Lawrence and the great lakes, was completed. The grand Erie Canal was so far completed that ten thousand barrels of flour were embarked at Rochester, for New York and Albany, and with the first boats passed on 8th October.

About thirty-five Manufacturing Companies, with a total capital of over two and a quarter millions of dollars, were incorporated in New York State, under the general act of 1811, since June 1818. The whole number of incorporated manufacturing companies in the state on 1st October, was two hundred and six, whose capital stock amounted to $20,350,500. Among these there were, for manufacturing cotton and woolen goods, sixty-two; for cotton goods only, thirty-six; for woolen only, sixteen; for cotton, woolen, and linen cloths, twelve; for glass, ten; ironmongery, five; coarse salt, three; and some others. Some of these had probably ceased to exist, but there were, in addition, hundreds of private and unincorporated companies.[1] The general law of 1811 was amended, in April of last year, to enable the trustees of such companies to mortgage the property of the corporation for the payment of debts, etc.

Oneida county contained, beside other manufactories equally extensive, a woolen mill, working up 80,000 lbs. of wool, six cotton factories, with 6,356 spindles, and 128 power looms, and a cotton and woolen factory, with seven hundred spindles and twelve power looms.

New Hampshire contained twenty-eight cotton and eighteen woolen factories, twenty-two distilleries, twenty oil mills, one hundred and ninety-three bark mills, three hundred and four tanneries, twelve paper mills, and fifty-four trip hammers. Dover, Exeter, Peterborough, and Pembroke, were the principal manufacturing towns, of which Dover was the most important, on account of the extensive cotton, woolen, and iron works erecting there. The Dover manufactories on the Cocheco, with a capital of half a million dollars, had in full operation twenty-five hundred spindles, and eighty-six looms, making forty-inch sheetings and thirty-inch shirtings to the amount of ten thousand yards per week, and had also a bleachery attached. A rolling and slitting mill, and nail works machine shop, were also in course of erection.

A cotton mill was building in the state, calculated for twenty thousand spindles, probably that of the Nashua Manufacturing Company, incorporated this year, which became the centre of extensive manufactures of cotton, iron, etc., on the Nashua river, the valuable water power of which was overlooked by the founders of Lowell.

A new manufacturing village arose, about this time, upon the south side

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(1) Niles's Register, vol. 25., p. 71.

of the Chicopee river, near Springfield, Massachusetts, upon land purchased in the last year by J. and E. Dwight, of Springfield, who, associated with other gentlemen of Springfield and Boston, were incorporated, in January of this year, as the Boston and Springfield Manufacturing Company, with a capital of $500,000. A dam and canal were made, and a cotton mill completed in 1825, to which two other mills and a bleachery were added, in the next two years, by the corporation, which, in 1828, assumed the name of the Chicopee Manufacturing Company, and now has four large mills, one of them containing over twenty thousand spindles and nearly seven hundred looms. It has other extensive manufactures of cotton, paper, arms, swords, hardware, castings, etc., the last mentioned business having been carried on there since 1786.

The rapidly increasing cultivation and consequent low price of Cotton in the United States, the success of the Waltham cotton establishment, which was regarded as the pride of America, and more recently of the new works at Lowell, and the increasing popularity of the domestic cottons, at home and abroad, which had already caused them to be counterfeited by foreign manufacturers, led to extensive preparations in different parts of the country, to prosecute the cotton manufacture, with all the advantages of associated capital and the most improved machinery. Calico printing, on a large scale, was also contemplated in several places, and had already been commenced in two or three. American Calicoes, or chintzes, of seven or eight colors, fast and brilliant as any imported, accompanied by specimens of jaconet muslin, suitable for gentlemen's neck cloths, spun and woven on the Brandywine, were sent early in the year to the editor of the Register at Baltimore. The printed cottons, being made of American cotton, were better than English prints of similar kind, which were usually made of the inferior Bengal or Surat cotton. They could be sold for twenty-five cents a yard. About forty thousand dollars were said to be invested in their manufacture. The Warren factory, at Baltimore, was making large preparations to manufacture calicoes, and finished its first bale in July of the ensuing year. Print works were erecting at Taunton and Lowell, Massachusetts, at Dover, New Hampshire, and were in operation on a smaller scale in Philadelphia.

Rhode Island, in proportion to its population, was more largely engaged in manufactures than any other state. The number of cotton manufactories in that and the adjacent parts of Massachusetts and Connecticut, chiefly owned in Providence, was estimated at one hundred. Among the largest were the establishments of Almy, Brown, and Slaters, at Smithfield, and that of the Blackstone Manufacturing Company, at Mendon, Massachusetts, the former having one hundred and sixteen, and the latter one hundred and fifty power looms, with six thousand spindles each, with bleach and dye houses, and other collateral works, and the Coventry Manufacturing Company, with four thousand spindles and seventy-two power looms, machine shop, saw and grist mill, etc.

Among other associations in the state, were the R. I. Society, for the Encouragement of Domestic Industry, with a fund of $12,000, the interest of which was awarded in premiums at their annual cattle show and exhibition of domestic manufactures, and the "Hamilton Society," in Providence, for the encouragement of manufactures.

The manufacture of Lace was carried on quite largely, at Medway, Massachussetts, by Dean Walker & Co. They employed machines, one of which would make daily fifty yards, five inches wide, which sold for two dollars a yard, or below imported lace of similar quality.[1] Several manufactories of silk, in New York, Boston, and elsewhere, were said to be doing well. Printed Silk handkerchiefs produced by them were highly spoken of. At the fair, in Providence, Rhode Island, Dr. Benjamin Dyer, of that town, wore a complete suit of silk from materials produced and manufactured in his own family.

The manufacture of plain Straw Hats and Bonnets, which had been gradually increasing for twenty years, was nearly suspended at this time by the demand for Leghorn goods and their extensive importation. In Massachusetts, where about three hundred thousand bonnets had been made and sold in a year, at an average price of $2.75 each, giving employment to twenty-five thousand persons, chiefly young females—the price was reduced to $1.25. The hats and bonnets imported during the last year, as stated in Congress, amounted to the value of over $700,000, of which $600,000 worth were from Leghorn and Malta. Many females in New England, New York, and elsewhere, were turning their attention to the manufacture of fine straw or grass bonnets, in imitation of Leghorn, for their own use or for sale, and specimens of these fashionable articles often sold for thirty to forty dollars apiece.

There was a Glass Globe Manufactory in Albany, New York, on a scale which promised to supply the United States with the article.

Lechmere Point, in Cambridge, near Boston, now contained a popu-

(1) This loom was of singular construction, and was made in the United States, from the recollection of a machine seen in England by the constructor. The warp was wound on twenty-six spools, each having a compound motion, and the spools, with twelve hundred and thirty shuttles, traversing side by side within a space of fifty-six inches, were kept in motion by one man, by means of two handles, three treadles, and two thumb pieces, producing a web of plain lace fifty-six inches wide. By drawing single threads, the web was divided into twenty-six pieces, from one and a half to five inches wide, which were afterward finished with ornamental needle work, by female hands.

lation of more than one thousand. Its recent and rapid growth was principally ascribed to its manufacturing and provision establishments. In the glass house, cutting house, and other appendages to the manufactory, one hundred and forty workmen were constantly employed. There were manufactured there 22,400 lbs. of glass vessels per week, many of which were beautifully cut and sent into Boston, and to various other places for sale. The annual amount of sales was $150,000. Besides an immense amount of provisions packed in the place, and large manufactories of candles and soap, there were at the Point an extensive pottery, a brewery, and two large carriage manufactories, and one hundred and fifty men were employed in the vicinity in making Bricks from an inexhaustible bed of clay.[1]

Mr. Jonas Booth, of New York, was said to have in operation the first Steam Printing Press in the United States, from which the first book printed was an abridgement of Murray's English Grammar.[2] The first power press in the country, is also said to have been used during the ensuing year, in the establishment of Shadrach Van Benthuysen, at Albany.[3]

Savings Banks were incorporated this year, at Troy, New York, and Portsmouth, New Hampshire. The savings banks and friendly societies of England and Ireland, had, at this time, $8,500,000 deposited in the government funds on behalf of the industrious classes.

Nicholas Longworth, Esq., of Cincinnati, about this time made his first essay in Wine Making. It was made from the Schuylkill, Muscadel or Vevay grape, which had been previously employed for many years by the Swiss settlers at Vevay, Indiana, in making wine of an inferior quality, which had, at this time, been altogether superseded by imported wines. By an improved method, Mr. Longworth made a wine resembling Madeira of the second quality, but having, soon after, received from Major Adlum, of Washington, some of the Catawba and other native grapes, he has since, by the aid of ample capital and an improvement on the process of Mr. Adlum, succeeded in establishing a permanent and yearly increasing manufacture of wine, chiefly from the Catawba, in the valley of the Ohio. He long since expressed his concurrence in the prediction made to him by Major Adlum, who said: "In introducing this grape to the public notice, I have done my country a greater service than I should have done had I paid the national debt" Mr. Adlum published this year, "A Memoir of the Cultivation of the Vine in America, and the best Mode of making Wines." The cultivation

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(1) Holmes's Annals.

(2) Niles's Register, vol. 24, p. 256.

(3) Merchants' Mag., vol. 21, p. 56.

of the vine was still continued in Indiana, and six vine dressers made, during this season, about five thousand five hundred gallons of wine. Mr. Eichelberger, of York, Pa., made also about forty barrels of wine, having ten acres of land covered with Lisbon, white, and other grapes He proposed to extend his vineyard to twenty acres.

The Farmers' Brewery, an extensive establishment built in the last year, at the corner of Tenth and Filbert streets, Philadelphia, by a company of farmers and farm-holders, for the purpose of manufacturing their own barley, and to increase the consumption of malt liquors, commenced operations early this year. There were fourteen or more breweries in the city, including the Farmers', Gauls', and some others still in operation.

The first lease of lands in the Lead region of the upper Mississippi, authorized by the act of March 3, 1807, which reserved such lands to the Government, was issued this year to Colonel James Johnson, of Kentucky, who commenced smelting the ore with a large force the following year, causing an active emigration during the next five or six years. The Government received ten per cent. in lead as rent, which was afterward reduced to six per cent. The amount of lead manufactured in the Galena Lead region, from 1821 to September of this year, was 335,130 pounds, chiefly by Indians; but rapidly increased from this time until 1829, when upward of 31,750,000 pounds had been taken out, and having been overdone, the business again declined.

On the 2d December of this year, the London Mechanics' Institute was established, and formed an epoch in the history of industrial education, as having first awakened public attention to the importance of instruction in elementary and practical science for the mechanic and artizan, and led to the general establishment of Mechanics' Institutes and other schools of art throughout the world. The suggestion of such an institution in London, was first made by the editors of the Mechanics' Magazine, October 11, of this year, and was carried out, primarily through the agency and at the expense of Dr. George Birkbeck, aided by Mr. Brougham and others, to the former of whom belongs the honor of having, twenty-three years before, in connection with the Andersonian Institute, at Glasgow, first made instruction in mechanical philosophy and chemistry accessible to the working classes.[1]

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(1) Hole's Prize Essay on Literary, Scientific and Mechanics' Institutions, London, 1853. London Mechanics' Journal, vol. 4, pp. 232–240. The London Institute, though not strictly the first institution of its class, has the merit of having first caused them to be appreciated. The "Mechanics" class of the Andersonian University, established in the year 1800, by Dr. Birkbeck, and, since 1804, conducted by Dr. Andrew Ure, was, about July of this year (1823), organised into the Glasgow Mechanics' Institute, and

In November, 1822, a similar measure for the promotion of the Mechanic Arts was discussed, but finally abandoned, by a number of gentlemen in Philadelphia, but was revived by others during this year. On the 9th December, a meeting was held in the hall of the American Philosophical Society, when both of the previous propositions were considered and so combined as to result in the establishment of an institution, which was incorporated on the 20th March, 1824, as the "Franklin Institute, of the State of Pennsylvania." Its constitution, framed by a committee appointed at the meeting above named, states the objects of the association to be "For the Promotion and Encouragement of Manufactures and the Mechanic and Useful Arts, by the establishment of popular lectures on the sciences connected with them; by the foundation of a library, reading room, and a cabinet of models and minerals; by offering premiums on all subjects deemed worthy of encouragement; by examining all new inventions submitted to them, and by such other means as they may deem expedient."

Much sensation was created in the scientific and manufacturing world, both in England and the United States, by an improved steam engine, in use in the establishment of Mr. Jacob Perkins, in London, for which letters patent were sealed to him in that country, 10th December, 1822, and for other applications of the principle, in November and December of this year. It combined, with great simplicity of construction and economy in the cost, weight of metal, space and quantity of water and fuel required, which adapted it for navigation purposes—a great increase of power. A cylinder two inches in diameter, eighteen inches long, with a stroke of only twelve inches, gave the power of ten horses, at an expense of only eighteen hundred and forty-eight cubic inches of water, and two bushels of coal daily. No new principle was claimed, but a new application of known principles, and these were also made applicable, during this year, to boilers of the old construction, and the heat was at

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the "Liverpool Mechanics' Institute and Apprentices' Library" was established the same month, both of which had, however, been preceded by the Edinburg School of Arts (now the Watt Institution), founded in April, 1821, by Mr. Leonard Horner. A mechanical institution had been formed as early as 1817, in London, and others the same year in Glasgow, Liverpool, and Haddington, but none of them attracted general attention until the London Institute was established, from which the history of Mechanics' Institutes is usually dated. It is proper to remark, that previous to the formation of any association of mechanics for mental instruction in Europe, a public-spirited gentleman of New York, favorably known for his scientific and literary publications and as a public lecturer, is said to have resolved to attempt to unite the mechanics of that city into an institution for the promotion of the mechanic arts, by lectures and other judicious means. Between July of this year and May, 1824, no less than thirty-three Mechanics' Institutes were established in Great Britain and elsewhere.

the same time made to return to the boiler, and perform its service the second time. The improvements related chiefly to the boiler or generator, and were also claimed by Mr. James Scott, of Providence, R. I., and by others in New York and Baltimore. It was regarded in England as one of the greatest improvements of the age.

Patents.—Lucy Burnap, Merrimac, N. H., Feb. 16, for weaving straw and grass for hats and bonnets; Wm. Knapp, Milford, N. Y., April 5, mode of extracting tannin; D. Roe, C. F. Kellogg, and J. W. Gazley, Cincinnati, Ohio, Oct. 3, mode of procuring tannin by the pyroligneous acid; and Horace H. Hayden, Baltimore, Nov. 26, pyroligneous oil and acid for tanning; Thomas Ewbank, N. Y., May 9, manufacturing and plating lead pipes with tin, for stills, and May 30th, manufacturing tinned sheet lead. This, we believe, was the first application in this country of tin as a lining or coating to metallic tubes and plates. Adam Ramage, Philadelphia, May 19, printing press for proofs; Amos Miner, Elbridge, N. Y., July 9, machinery for making window sash. This machinery had been several years in operation in Onondaga county, and the product was rising in demand. Henry Western, Philadelphia, July 23, improvement in the machine for making pins;[1] Archibald Smith, Rhinebeck, N. Y., Aug. 30, converting measured rectilinear motion into rotary; James Delliba, Watervliet, N. Y., Sept. 26, improvement in crucibles; E. L. Losey, New Brunswick, N. J., Nov. 20, converting iron partially into steel (antedated Dec. 30, 1837). A cutler and surgical instrument maker, of New York, early the next year, testified to having used two samples of New Brunswick patent steel, made by S. Seymour & Co., one of bloomery iron, of Morris & Co., of which he made penknife blades, the other from Swedish iron, of which he made a razor, and found both superior to any English blistered steel. For coarser kinds of edged tools, either was little inferior to cast steel. John Conant, Brandon, Vt., Dec. 13, improvement in stoves for cooking.

President Monroe, in his seventh annual message, delivered to the eighteenth Congress, at its first session on 2d December, 1823, once more referred to the subject of manufactures, and declared that his
1824 views, as stated in his previous message, remained unchanged, and were confirmed by the state of those foreign nations, with which the

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(1) Mr. H. Whittemore had in operation, in New York, a small pin machine, of American invention, which he had so improved that it would make, head and point, thirty solid headed pins in a minute, from the simple wire, and required only one man to keep it in motion. In London they were only able, at that time, to make fourteen pins in a minute, and they were less perfectly made.

United States held the most intimate political and commercial relations. He recommended "a review of the tariff for the purpose of affording such additional protection to those articles which we are prepared to manufacture, or which are more immediately connected with the defence and independence of the country." In relation to the general progress of the country, he adds, "If we compare the general condition of our Union with its actual state at the close of our revolution, the history of the world furnishes no example of a progress in improvement, in all the important circumstances which constitute the happiness of a nation, which bears any resemblance to it."

Notwithstanding the unexampled progress of the United States in all the essential elements of the public welfare, as adverted to in the executive message, many professed at this time to discover evidences of a general impairment of the great sources of national prosperity, since the peace of 1815, and of the threatened overthrow of some important branches of American industry. The manufactures of the country were believed to have been long undergoing a slow disintegration from the effects of foreign rivalry. The public finances had been so far impaired as twice to compel a resort to loans, during a period of profound peace, in order to meet the ordinary demands upon the Treasury. The agriculture and commerce of the Union were already suffering from causes which had dried up the sources of public and private revenue.

The conviction, which had long been gaining strength, that the industry of the country was inadequately protected against the superior advantages, encouragements, and arts of the foreign manufacturer, by the commercial regulations of the United States, and which had produced several ineffectual attempts to procure a revision of the tariff act of 1816, resulted, during this session, in the passage of a new law, which extended, to several branches of manufacture, a more decided measure of protection than any before enacted.

The measure was pressed upon the attention of Congress by an unusual number of memorials and petitions, from various sections and interests in the country. It was also the subject of numerous remonstrances and memorials, from the commercial classes, and from the cotton and sugar growing interests, which were opposed to any change in the tariff, or to any further legislative encouragement to manufactures. Resolutions of the General Assemblies of Pennsylvania and Ohio were also read in favor of further aid by Congress to domestic manufactures.

The total value of dutiable imports, during the last four years, was $264,962,457, and the duties which accrued thereon amounted to $90,430,612, being an average of thirty-five per cent. The new tariff, enacted this year, raised the average rate of duty to forty and a half per cent., on a total importation, during the next four years, of $301,558,885, on which duties were paid to the amount of $121,637,942.

The new bill, to amend the several acts imposing duties on imports, which was introduced by Mr. Tod, chairman of the Committee on Manufactures, on the 9th January, was taken up in Committee of the Whole on the State of the Union, on the 10th February, and its objects and principles explained by Mr. Tod. The duties proposed were to be laid upon two distinct classes of articles, one embracing silks, linens, cutlery, spices, and others of less importance, which were by no means necessaries, and did not interfere with any home production or manufacture for which the country was prepared. Most of these were charged with the rates recommended by the Secretary of the Treasury, and chiefly for revenue, and to supply the deficiency occasioned by checking the excessive importation of other articles. But the important duties in the bill were for the purpose of protection, and included those upon iron, hemp, lead, glass, wool, and woolen goods.

As to the details of the bill, it was not proposed to change the duty on cottons, except that the minimum valuation was raised from twenty-five to thirty-five cents the square yard, in order to protect fabrics two or three grades finer than was now done. The protection was already effectual on the three lowest grades of cotton, which would never be imported. On cotton bagging, a specific duty of six cents a square yard was proposed, intended to be protective and prohibitory, for the benefit of Kentucky and the Western States, which consumed large amounts of cotton already protected by three cents a pound. This duty was strongly resisted by the members from the cotton states, who regarded it as a tax of over $200,000 per annum upon the cotton growers, who used some four million yards annually, for the benefit of a few hundred workmen in Kentucky. The duty was consequently reduced to three and three-quarter cents a yard. Upon all manufactures of wool, a duty of thirty per centum ad valorem, and, after 30th June, 1825, thirty-three and one third per cent., with minimum valuations of forty and eighty cents respectively, upon milled and unmilled goods, excepting blankets and stuff goods. The rate was, however, reduced to twenty-five cents per square yard, on goods costing less than thirty-three and one third cents per square yard, and after June 30th, 1825, thirty-three and one third per cent. on those costing more than that.

The encouragement of wool growing being an object of the bill, that article was charged with twenty-five per cent. ad valorem when costing over ten cents a pound, to be raised to thirty, forty, and fifty per cent., which was to be the permanent rate after June, 1827. These rates were reduced to twenty, twenty-five, and thirty per cent., which last was to be the duty, after June, 1826, upon all wool costing over ten cents a pound at the place whence imported, and fifteen per cent. on wool costing less than ten cents. On Leghorn, straw, and chip or grass hats and bonnets, and braid or plat, fifty per cent. On hammered iron, $1.12 per one hundred and twelve pounds, reduced to ninety cents or eighteen dollars per ton, rolled iron being left as before. On window glass, from three to four dollars per hundred feet, according to size, and on black glass bottles, from two to three dollars per gross; on hemp two cents a pound, reduced to thirty-five dollars per ton, ad valorem; on pig lead the duty was raised from one to two cents a pound, and on red and white lead from three to four cents; on alum, the duty was increased from one to two dollars and fifty cents a hundredweight; on copperas, from one to two dollars; on oil vitriol and refined sulphate, the duty was changed from seven and a half per cent. to three cents a pound; Epsom salts three cents, Glaubers salts two cents a pound. The increase of duties on these and other chemicals, was followed by a remarkable reduction of the price, within a few years, and by the firm establishment of the manufacture of most of them.

The bill was the subject of a protracted debate, and received the able support of Mr. Clay, Speaker of the House, who, on the 31st March, in reply to Mr. Barbour, of Virginia, and other opponents, spoke between four and five hours, and on the following day concluded a brilliant and elaborate argument in favor of protection. He described the prostrate condition of every branch of domestic industry, and the suffering of every class of the community, tracing the causes in the foreign policy of the Government. He enunciated his belief that the true remedy was to be found in the abandonment of that policy and the adoption of "a genuine American System" of encouragement to domestic industry, in imitation of the prevailing policy of other nations, which had always promoted their prosperity and depressed our own. Mr. Buchanan, of Pennsylvania, spoke on the same side, chiefly in reference to the shipping, tonnage, and iron interests. Their views were ably combated by Mr. Webster, who represented the commercial and shipping interests, and opposed high duties on hemp and iron, and some other provisions of the bill. He quite dissented from the Speaker's opinion, as to the general condition of the country, which he considered one of extraordinary prosperity, with the exception of diminished prices and profits, and some pecuniary embarrassments, in the payment of debts contracted when prices were high, attributable to other causes than a diminution of exports. Messrs. Randolph, of Virginia, McDuffie, Tucker, and Hamilton, of South Carolina, and others from the cotton states, denounced the whole system of protection, and argued that foreign nations would no longer take their supplies of cotton if we did not take their manufactures. It was also opposed by Mr. Foote, of Connecticut, and others, and well defended by Mr. Holcombe, of New Jersey, Mallory, of Connecticut, and others who spoke on the same side. The Committee of Agriculture reported in favor of the bill, which, with some amendments, passed the House on the 16th April, by a vote of one hundred and seven to one hundred and two. Having been considerably modified in the Senate, the House, after a Committee of Conference, rather than lose the bill altogether, concurred in most of the amendments and reductions, and it finally passed on 19th May, by a vote of one hundred and twenty-five to sixty-six, and was approved on the 22d.

An act was also approved, January 7th, suspending the discriminating duties of tonnage and import, so far as they related to the vessels, produce, or manufactures of the Netherlands, Prussia, Hanseatic cities, Norway, Sardinia, and Russia, so long as United States vessels were exempt from like discriminations in their ports; and authorizing the President to proclaim reciprocal exemption from such duties, on evidence that any foreign nation had abolished its discriminating duties on goods and vessels of the United States.

An act of May 26, allowed to vessels in the cod fishery, lost or wrecked on their return to the United States, the same bounty as if they had returned to port.

The Franklin Institute, of Pennsylvania, incorporated March 30th, commenced, on 28th April, the first course of instruction in mechanical science in the United States, by a lecture delivered at the Philadelphia Academy, on north Fourth street. The first course was attended by twenty-seven junior students, the second by one hundred and twenty-six, and the third by one hundred and eighty. On the 2d June, a letter from the Secretary was read to the members of the London Mechanics' Institute, announcing its formation, with objects kindred to those of the London Institution. Soon after its formation, "a regular system of lectures was adopted, four professorships created, namely, of Natural Philosophy, Chemistry and Mineralogy, Architecture and Mechanics. One evening in each week was set apart for lectures on miscellaneous subjects. A library, a mineralogical collection, a museum, and a cabinet of models were commenced. An exhibition of manufactures was held, at which premiums were awarded." The first annual exhibition of the products of domestic industry, took place on the 18th and two following days in October, when gold, silver, and bronze medals were adjudged for the best articles, and proved serviceable by exciting competition.

The Rensselaer Institute was this year established and endowed at Troy, New York, by Hon. Stephen Van Rensselaer, for the instruction of young men in the application of mathematical science to civil engineering, and in natural science.

In July, a school was established, at Baltimore, for the instruction of poor girls in the various branches of straw plaiting, from the simple plait to the finished bonnet. It was supported by contributions from a few individuals, and was known as the Baltimore Plaiting School, but was not self-sustaining at the end of the first year.

The amount of manufacturing capital authorized and incorporated by state laws, since 1820, was, in New Hampshire, $5,830,000; in Massachusetts, $6,840,000; in Connecticut, $1,300,000; and in New York, $797,000, which, added to the amount authorized and employed in seven states, in 1820, made a total of $70,656,500.[1]

The New Jersey Bleaching, Printing, and Dyeing Company, at Belleville, nine miles from New York, was incorporated in December, with a capital of $150,000, and erected one of the largest and most complete manufacturing edifices in the United States. The printed calicoes ranked with those of the Taunton and Chelmsford factories. Within ten years the calico print works of Andrew Gray, the silk printing establishment of Duncan & Cunningham, a brass rolling mill and button factory, two copper foundries and rolling mills, a britannia metal factory, lamp factory, and large grist mill, in the place, produced articles valued at two millions of dollars per annum.

The Merrimac Manufacturing Company was at this time making about twenty-five hundred yards of printed cottons daily. Calicoes were this year first made in the Warren factory, at Baltimore.

Flannel was woven by water power, in Massachusetts, and specimens exhibited at the fair, in Brighton, in November, gave general satisfaction. Within forty miles of Boston, about fifteen thousand pieces of flannel, of forty-six yards each, were made in the last year, and new mills were erecting, which, with the enlargement of old ones, would make thirty thousand pieces this year. There were factories of the same article in New York and Connecticut.

Philadelphia had, at this date, upward of thirty cotton mills, some of them quite extensive. They averaged fourteen hundred spindles each, and together employed nearly five thousand looms and three thousand persons. There were in the city fifteen breweries, and umbrellas were manufactured there to the value of $400,000 annually.

In the borough of Reading, Pennsylvania, about six thousand pounds of wool were wrought up into fifteen thousand pair of fine wool hats, giving employment to five hundred persons.

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(1) Report of Secretary of State in obedience to Resolution of Senate of March 1, 1823.

On the 27th of January, a charter was granted by the State of Virginia to the Chesapeake and Ohio Canal Company—subject to the approval of Congress, and of the States of Maryland and Pennsylvania, which was obtained the next year—for the construction of a canal from tide water above Georgetown, D. C., on the Potomac, to Pittsburg, a distance of three hundred and forty-one miles. The capital stock was six millions of dollars, with power to augment it, which it became necessary to do.

The Legislature of New Jersey also, on the 31st December, granted acts of incorporation to companies authorized to construct the Delaware and Raritan canal, and the Morris canal, the former suggested in Mr. Gallatin's Report, in 1808, and the latter surveyed and leveled, in conformity with an act of the state, passed in November, 1822. The last of these important works of internal improvement opened up communication between the Delaware river at Phillipsburg, opposite Easton, and the Passaic at Newark, over mountains, in the district of Warren, Morris, and Essex counties, nine hundred feet above sea-level, which were overcome by locks and inclined planes. It gave access to the anthracite mines of Pennsylvania, and a cheap outlet for the iron of that region, which at one time contained eighty-one forges and twelve furnaces, of which thirty of the former and nine of the latter had, at this time, gone to decay, in part from the scarcity of fuel and the increasing cost of transportation.

The steamboat "Erie Canal" arrived in December, at Genesee Landing, having passed through the feeder at Rochester. She was the first boat upon that river, and was supposed to have shown the practicability of navigating canals by steam, without injuring them.

Nine daily newspaper offices in New York city were estimated to issue 85,600 newspapers every week, exclusive of eight or ten weekly papers, of which the circulation was unknown. An official return to the Postmaster General, stated the whole number of newspapers published in the United States at one hundred and ten, of which eighteen were issued in Philadelphia, eleven of them being dailies.

The first Book Trade Sale in Philadelphia was held this year, according to the suggestion and plan of Mr. Henry C. Carey. The auctioneer was Moses Thomas, by whom these sales are still conducted semi-annually, under the name of Moses Thomas & Sons, having, during a part of the intermediate time, been under the management of Cowperthwait & Lord, Lord & Carlisle, and George W. Lord & Son. The city contained, at this date, fifty-five printing offices, with one hundred and twelve presses, supporting about one hundred and fifty workmen.

Land and water power were this year purchased, in Greene county, New York, by Zadoc Pratt, who established at the village, since called Prattsville, on Schoharie creek, a mammoth tannery, for the manufacture of hemlock-tanned leather—the forest, on either hand, to the very tops of the mountains, being covered with a dense growth of hemlock, adapted to his purpose. His tannery was five hundred feet long, containing over three hundred vats, requiring a consumption annually of fifteen hundred cords of wood, and six thousand cords of hemlock bark in the manufacture of six thousand sides of sole leather, which he annually sent to market, or more than a million sides in twenty years. He employed a capital of over $250,000, it is said, without a single litigated lawsuit, or the loss of one dollar in bad debts, or having a single hide stolen. To his enterprise and public spirit the village of Prattsville owes its growth, and the Catskill region much of its prominence as the principal leather producing district of the United States. The first hemlock-tanned leather in England was sent, in 1842, from the Prattsville tannery.[1]

An improvement in tanning was introduced this year, and patented the next, by Mr. Joseph Giles, of Guilford, or Brattleborough, Vermont, by the use of a liquid extract, or essence of oak and hemlock bark, so concentrated as to tan calf skins in forty-eight hours, one hogshead containing the tannin of four cords of bark. He began the erection of extensive works for the manufacture of the article. Tanneries about this time began to be provided with roofs, instead of being open as formerly.

The sugar crop of Louisiana was estimated at forty thousand hogsheads.

The manufacture of Isinglass, from the swords of hake fish, for the use of cotton manufacturers, was commenced at Gloucester (now Rockport), on Cape Cod, in Essex county, Massachusetts, which a few years later was the only place in the United States where it was made.

In Albany, New York, were five extensive breweries; that of Fiddler & Taylor, supposed to be the largest in the United States, was capable of manufacturing two hundred and fifty barrels of beer in a day.

The Company owning the large manufacturing establishment called

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(1) This eminent manufacturer, who probably tanned more sole leather than any man in the world, was himself the son of a tanner, and rose from the humble position of a journeyman, by the force of his own energy and character, to places of honor, influence, and public trust. He was not less distinguished for uprightness, benevolence, and public usefulness than for perseverance, intelligence, and success in business. In Congress, to which he was elected in 1836, he proposed many important measures, among which were the introduction, through the United States consuls and national vessels, of foreign seeds and plants for general distribution by the Patent Office, and the publication and engraving of all the important patented inventions for circulation throughout the country, and the establishment of a Bureau of Statistics.

Ramapo mills, in Rockland county, New York, was incorporated this year, with a capital of $400,000. The Company owned four thousand acres of land, and the village contained, in 1833, rolling and slitting mills, cut nail factory, large cotton mill, grist and saw mills, etc., the first of which had been many years in operation.

The Glenham Woolen Manufacturing Company, composed of Messrs. P. H. Schenck, G. E. and S. S. Howland, John Jacob Astor, Philip Howe, and others, was incorporated in the State of New York. The factory was erected, during the last year, by Mr. Schenck, upon the Matteawan, or Fishkill creek, in Dutchess county, two miles above the extensive Matteawan Cotton Factory of the Messrs. Schenck and others, built in 1814. It manufactured superfine blue and black broadcloths, but sunk considerable money during the next three years. The average value of its manufactures, during twenty years, was $100,000. The Messrs. Schenck were also interested in an extensive flour mill, foundry, and machine shop at this place.

The Tufts Manufacturing Company, at Dudley, and the Ware Manufacturing Company, at Ware, Massachusetts, were incorporated, and commenced operations about this time. The Boston and Ipswich Lace Factory was this year incorporated, with a capital of about $150,000, for the manufacture of lace by machinery, the business having been carried on there by hand for nearly half a century.

PATENTS.—Gilbert Brewster, Norwich, Conn., Feb. 27, patented an improvement in the wool spinning wheel, and March 13, received three patents, viz.: for a spinning machine and method of receiving rolls from the machine; for an improvement on spinning wool, and for a spindle for throstle spinning. These, and later improvements in cotton and wool spinning machines, by Mr. Brewster, came into quite extensive use, and a few years later were manufactured by him to a large extent at Poughkeepsie, N. Y. George Danforth, Morton, Mass., Sept. 2, counter twisting spinning speeder. The Danforth throstle frame was an important improvement upon the ordinary throstle, which had superseded the water frame. It dispensed with a flyer, and produced yarn less wiry and more economically from certain kinds of goods, than the common throstle. It was patented in England, about 1830, by John Hutchin, Esq., of Liverpool, and gave rise to numerous later inventions for the improvement of the original throstle.[1] Some fourteen or more patents were this year granted for improvements in spinning wheels, and other cotton and wool spinning machinery. Joseph P. Rossiter, Selina, N. Y., March 2, improvement in making fine and coarse salt; and Peter

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(1) Ures' Cotton Manufacture.

Cooper, New York, Dec. 23, mode of manufacturing salt; Samuel Brown, London, England, March 2, gas engines, and Maximin Isnard, New York, Dec. 11, improvement in gas engines; Jeremiah Dewey, Chelsea, Vt., April 2, improvement in the spring lancet, and Thomas R. Williams, Newport, R. I., July 16, retreating spring lancet; John R. Averill, Manchester, N. Y., May 27, cast iron steam boilers. Numerous improvements in the steam engine and boiler were patented this year. John Stevens, Hoboken, N. J., June 8 and Oct. 23, improvements in railways; the same, June 8, rendering rapids and shallow rivers navigable; John Brown, Providence, R. I., June 28, improvement in making razors; Henry and Ezra Hoopes, Wilmington, Del., July 26, improvement in revolving hay rakes; Moses Pennock, Kennett Square, Pa., Nov. 23, improvement in revolving horse hay rakes; John A. Wadsworth, Newport, R. I., July 3, horse scythe; David Henderson, Jersey City, N. J., Sept. 17, improvement in lithography.

On the 3d of January of this year, Eli Whitney, the inventor of the saw gin, and one of the most eminent mechanics of his age, died, at the age of fifty-nine. He had lived to see the cotton crop of the United States increased, from about five millions of pounds to two hundred and fifteen millions, and the exports of the article augmented from less than half a million pounds to one hundred and forty-two and a quarter millions of pounds, the result in no small degree of the benefits conferred upon the planter by his invention.

1825

In the early part of this year considerable speculation was indulged in the exportation of cotton, which, during the year, reached the large amount of 563,129 bales, 176,500,000 pounds, valued at $36,846,649, being more than thirty-two millions of pounds in excess of the total importations from all countries into Great Britain. The average price was in consequence advanced in the United States from fifteen in the last year to twenty-one cents in the present, the extreme prices of Uplands in Charleston being thirteen and a half to thirty-two cents per pound. Nothwithstanding an advance in the price in England, from about eight and a half to eleven and a half pence, the excessive speculation involved many shippers in ultimate loss, the average price having declined to eleven cents in the United States, and to nine and a half pence in England during the next year. The amount grown this year in the United States was two hundred and fifty-five millions of pounds. Some apprehension was felt at the increased importation of Egyptian cotton in England, which, commencing in 1823 with 5,623 bales, reached this year to 111,023 bales, but immediately fell off again as rapidly.

The caterpillar or cotton moth, which had only occasionally appeared since 1804, renewed its visits in South Carolina with devastating effects, and during several subsequent years continued with some intermission to lay waste the cotton fields.

The number of spindles employed in cotton factories in the United States, at this time, was 800,000, and the domestic consumption of raw cotton was about 100,000 bales.

Several important improvements were made in cotton machinery in England this year, among which the most important were the mule spinner, patented by Mr. Roberts, of Manchester, M. De Jong's self-acting mule, and the tube frame, introduced from America by J. C. Dyer, who also took another patent for wire cards, and for other objects. In and around Glasgow, within a circuit of two miles, steam engines of eight hundred and ninety-three horse power were employed in spinning cotton, and the number of factories in the neighborhood of Manchester was one hundred and four; at Preston, forty; Stockport, forty-seven, and Staley Bridge, twenty-five.

At Columbiaville, near Hudson City, N. Y., were three cotton factories, employing two hundred and fifty persons. Two of them made about 340,000 yards of cotton shirtings yearly, worth thirteen cents a yard, and a new mill on the south side of the creek was calculated to produce 360,000 yards of a finer fabric, worth twenty-four cents a yard. The city of Hudson was the third town in the state in regard to manufactures, and in 1822 had eight factories, employing five hundred hands, and working 364,300 pounds of wool into 711,200 yards of cloth.

Cutts, or Factory island, at the Falls of the Saco river, in Maine, was this year purchased by a company, principally from Boston, for the purpose of erecting an extensive cotton factory. The whole cost to the company was $110,000, to which was added $10,000, for a considerable part of the privileges on the opposite side of the river, purchased at the same time. During the next year a canal was cut from the head of the falls to the mill site, and a factory erected two hundred and ten feet long by forty-seven wide, seven stories high. It was the largest factory ever attempted in America, and was calculated to operate twelve thousand spindles and three hundred looms. The machinery was completed in 1830, at a cost of $200,000, but the whole establishment was the same year burned to the ground, with a loss to the company of all the stock. Another company was formed, and the mill was rebuilt.

The Merrimac Manufacturing Company, at Lowell, whose mills, since the death of Mr. Ezra Worthen, in the last year, were superintended by Warren Colburn, and their print works by Allan Pollock, who was succeeded next year by John D. Prince, of Manchester, England, increased their capital to $1,200,000, built three additional mills, and made their first dividend of one hundred dollars per share. A canal company was organized by the stockholders, to which was transferred all the surplus water power, and the price for a mill power, with a suitable quantity of land, and the privilege of drawing twenty-five cubic feet of water pei second, on a fall of thirty feet, equal to about sixty horse power, was fixed at $14,336, of which $5,000 was to remain, subject to an annual rent of $300. The average price of its Prints, at this time, was 25.07 cents a yard. The first sale was made this year to the Hamilton Manufacturing Company, the second of the large corporators of Lowell, which was chartered this year with a capital of $600,000, afterward increased to $1,200,000. Mr. Samuel Batchelder, of New Ipswich, now Treasurer of the York Manufacturing Company, at Saco, was appointed superintendent, and under his skillful management the power loom was first applied to the weaving of twilled and fancy goods, with great success. Cotton Drills, an American fabric, which soon became one of much value in the export trade, were first made in this establishment. The company established print works in 1828, under Mr. William Spencer, who is still the superintendent.

The Middlesex Mechanics' Association of Lowell was incorporated this year, and now owns a hall, with a library of five thousand volumes, a cabinet of natural history, and paintings of Washington, Webster, Kirk Boot, P. T. Jackson, Abbott Lawrence, N. Appleton, and John A. Lowell.

The Pontoosuc Manufacturing Company, of Pittsfield, Massachusetts, was chartered, and built a mill this year for the manufacture of all wool and cotton warp broadcloths, and was long celebrated for the manufacture of a superior quality of drab cloth for carriage linings, which was distinguished for its purity of color and beauty of finish. The first broadcloth power loom in Berkshire county was set up this year.

Agreeably to a proposition made at a meeting of manufacturers in Philadelphia, during the last year, an exhibition of domestic manufactures was held in Washington in February of this year, for which purpose Mr. Little, superintendent of the Capitol, tendered the use of the Rotunda. Among the articles exhibited were cloths from the factory of Mr. Wells, Steubenville, Ohio, at from three to twelve dollars a yard; blankets, much admired for substance and fleecy whiteness, at twelve to fifteen dollars per pair, by Mr. E. Patterson, of the District of Columbia; fine flannels by Mr. Van Croft, on the Brandywine; specimens of flannel and grass cloth from New Harmony, Ind.; excellent lace bobbinet and thread from Dean, Walker & Co., Medway, Mass.; coach bindings by Catharine Gattie, of Baltimore; improved hats by Mr. Hamelin, of Baltimore, made of Russia cotton duck, and varnished, which were much approved of by the Department for Seamen; machine cards by Mr. McCoy, of Baltimore; improved saddles by Mr. Prettyman, of Alexandria; oil cloth by Mr. Macauley, of Philadelphia, in great variety of patterns, and some of the finest quality for taste and design, and beauty of execution; stair carpets by Mr. Wilson, of Baltimore; shovels and spades by Mr. Harvie, of Richmond, Va., of the finest workmanship and material, as were also the axe heads from Baltimore, by Mr. Kinsey.

Pittsburg contained at this time seven steam rolling mills in active operation, making bar and sheet iron, nails, etc., and one of them in addition axes, scythes, sickles, shovels, etc. There were also eight air foundries and a cupola furnace, making stoves, grates, hollow ware, sad irons, shafts and wheels for steam machinery, common wagon boxes, plough castings, and other articles, from a quarter pound weight to four tons. McClung's "Pittsburg foundry" had a mill for boring cylinders, turning rolls and shafts, grinding sad irons, etc. Metal castings averaged from sixty-five to seventy dollars per ton. There were also six steam engine factories, some of which built six engines during the season, and Mark Stackhouse constructed one of one hundred horse power for the Phœnix Iron Works, near Philadelphia. Eichbaum's wire factory had been recently put in operation again, with an engine of ten horse power. There were five blast furnaces north of the Allegheny river, supplying metal to Pittsburg, viz.: two in Butler county, one in Armstrong, one in Venango, and one in Crawford, besides several in Fayette, Westmoreland and Beaver counties, and a new one just erected by J. W. Biddle, on a large scale, on the Kiskimenitas, in Armstrong county. There were nine paper mills in Western Pennsylvania, four of them owned in Pittsburg, besides two in Jefferson county, Ohio; six of them contained two vats each, and one three vats, with water power. Three others were worked by steam, one having three vats and a twenty horse power engine, the others four and six vats, respectively, with engines of thirty horse power. The product of all the mills was estimated at $150,000, and the rags consumed, at $58,000 per annum. Seven glass works, including that established by Mr. Gallatin, at Geneva, made 27,000 boxes of glass annually, valued at $135,000, in addition to $30,000 worth of white and flint glass, and about $100,000 worth of the product was probably exported. Pittsburg glass undersold the imported in Eastern cities, and received the premium of the Franklin Institute in the last year, over numerous specimens. Within the last three years twenty-one steamboats, whose tonnage was 3,720 tons, were built at or near Pittsburg, and one was building at Brownsville to draw only two and a half or three feet of water, with her engine in. At Walker's boat yard, at Elizabethtown, a keel boat was launched every month during the past year, worth, on an average, $275 each.[1] The manufactures of Pittsburg, during this year, were estimated at $2,500,000. In consequence of its profitable manufactures, Pittsburg experienced little of the pecuniary distress which this year visited many portions of the country.

The Harmony Society, under Mr. George Rapp, having returned to Pennsylvania from Indiana, commenced operations at Economy, eighteen miles below Pittsburg, in Beaver county, where they built a large town—an elegant church, a large cotton and woolen factory, store, tavern, large steam mill, a brewery, distillery, tanyard, and other workshops. Their factories and workshops were warmed by means of pipes connected with the steam engine, and in other respects the Society were ready to adopt the latest improvements. They purchased annually from sixty to seventy thousand dollars' worth of wool, and twenty to thirty thousand dollars' worth of other articles for manufacture and consumption, and three years after commenced the culture and manufacture of silk.

The completion of the Erie canal opening internal communication between the waters of Lake Erie, at Buffalo, and the Atlantic Ocean, was celebrated on the 26th October, at Albany. Cannon were fired along the whole line, and a flotilla of boats conveyed Governor Clinton and the Commissioners over the route to New York, where the first boat arrived, November 4th. Its cost was about eight millions of dollars.

The licensed tonnage of all the lakes above the Falls of Niagara, consisted of three steamers of 772 tons, and fifty-four sailing craft of 1677 tons, making an aggregate of steam and sailing tonnage entering the ports of Buffalo of only 2,449. It was increased in the next five years to 16,300 tons, or 113 per cent. In the United States nine hundred and ninety-four vessels, including thirty-five steamers, were built in the year, whose tonnage was 114,997.

The Buffalo Steam Engine Works, or furnace, was incorporated for the manufacture of steam engines, mill gear, and other castings.

A small cupola furnace, the first in the city, and said also to have been the first in the state, was erected by Mr. William A. Wheeler, at Worcester, Massachusetts, where the manufacture of tools and machinery has since become extensive. His principal business was machine castings, and ten years after he is said to have made the first hot air furnaces, for warming houses, in New England.[2]

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(1) Portfolio for September, 1825.

(2) The first heating of houses by flues, from anthracite furnaces, is stated by Professor Walter R. Johnson, in his American edition of Knapp's Chemical Technology, (vol. 2, p. 58), to have been made, as far as he knows, in his own family, during the last or present year. A large house was heated by means of a furnace in the cellar, surrounded by an air chamber of brick-

The manufacture of paper, by the Fourdrinier machinery, commenced about this time at Springfield, Massachusetts. One of the mills of J. & J. Gilpin, in Delaware, where machinery was first employed in this country, was this year destroyed by fire. The paper manufactory of Messrs. D. & J. Ames, at Springfield, was said to be the most extensive at this time in the United States, employing twelve engines, and more than one hundred females, besides the usual number of male hands.

A Geological reconnoisance of the State of North Carolina, made during the last year by Professor Olmsted, directed public attention to the gold-bearing region of the state, which he estimated to embrace an area of over one thousand acres. All the gold obtained in the state up to this time was from washings, at three principal localities. But gold having about this time been found in place by M. Barringer, of Montgomery county, attention was thenceforward directed from the "deposit mines" to the "vein mines." The first native gold from Anson county was this year coined at the mint, and valuable quartz veins were soon after found in Mechlenberg county.[1]

Anthracite coal was this year sent to market from the Lehigh mines in Pennsylvania, to the amount of 28,396 tons, and 6,500 tons were sent also from the Schuylkill region, being the result of the first mining operations in the latter place. The whole quantity from both sections was 25,355 tons in excess of the last year's product.

The first successful attempt to generate steam, with anthracite fuel, was made this year at the Phœnixville Iron works, by Messrs. Jonah and G. Thompson, of Philadelphia, who completed in January a steam engine for their Nail works on French creek, in which anthracite was employed.

Sewing silk and raw silk were produced this year in Windham county, Connecticut, to the value of $54,000, being double the quantity produced by the county in 1810. Sewing silk formed a part of the circulating medium, and was readily exchanged at the stores for other articles, the buyer giving the balance in silver when the account was in favor of the seller. The only machines used were the common domestic small and large wheels. Three fourths of the families in Mansfield were engaged in raising silk, making annually from five to ten, twenty, and fifty pounds in a family, and some as much as one hundred pounds in a season. It was thought that three or four tons were made annually

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work, whence the gaseous products of the combustion were carried through the building, passing through cylindrical drums on the first and third floors, and out at the top. This mode of warming buildings doubtless contributed to the general use of anthracite fuel in the Atlantic states.

(1) Whitney's Metallic Wealth of the United States.

in the town and vicinity. The increased attention given to the business in that place directed interest in other parts of the country to the subject, and Congress, on the 29th December, adopted the following resolutions, introduced by Mr. Miner, of Pennsylvania.

"*Resolved*, That the Committee on Agriculture be instructed to inquire whether the cultivation of the mulberry tree, and the breeding of silk worms for the purpose of producing silk, be a subject worthy of legislative attention; and should they think it to be so, that they obtain such information as may be in their power respecting the kind of mulberry tree most preferred, the best soil, climate and mode of cultivation, the probable value of the culture, taking into view the capital employed, the labor and the product, together with such facts and opinions as they may think useful and proper.

"*Resolved*, That the same Committee inquire whether any legislative provisions are necessary to promote the production of silk."

The report was made in May following.

PATENTS.—E. Daggett, and T. Kensett, New York, Jan. 19, for preserving animal substances; T. Rowell, Hartford, Vt., Feb. 10, pointing, splitting, and waxing wooden pegs; S. H. Weed, Poughkeepsie, N. Y., Feb. 28, making brushes and brooms of grasses; Lemuel W. Wright, Manchester, England, March 12, improvement in machine for making pins. This machine for making solid-headed pins was patented in England, in May, 1824, by Mr. Wright, a native of New Hampshire, who, in 1826, had a manufactory in operation at Lambeth, which proved ruinous to himself and partner. The same machinery was set up in 1832 or '33, at Stroud, in Gloucestershire, by his former partner, and the first solid-headed pins in the English market were made with it. It was however defective in forming the point.[1] Isaac Macauley, Philadelphia, April 4, improvement in making oil cloth—Mr. Macauley had carried on the manufacture for many years in Philadelphia, and was probably the first in this country—Joseph B. Nones, Philadelphia, April 28, making yellow and buff nankeen; Joseph Grant, Providence, April 28, setting up hat bodies (first patented, 1821). A large steam factory for making hat bodies, under this patent, was carried on in Pittsburg in 1837, by D. P. Ingersoll. John Giles, Guilford, Vt., April 11, improvement in Desmond's mode of obtaining tannin; Daniel Stansbury, Belleville, N. J., April 15, furnaces for fossil coal; Oliver Woodruff, New York, Nov. 7, and John L. Sullivan, New York, Nov. 26, furnaces for anthracite; Eli Terry, Plymouth, Conn., May 18 and Sept. 9, wooden-wheeled thirty-hour clocks; Josiah Durden, Washington, Ala., June 25, water power cotton press; Lewis Lyssard, Halifax, N. C.,

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(1) Newton's London Journal, vol. 9. Ure's Dictionary.

Sept. 28, machine for packing cotton; J. N. Gordon, Plymouth, N. C., Oct. 8, improvement in machine for pressing cotton; J. P. Bakewell, Pittsburg, Pa., Sept. 9, improvement in making glass furniture knobs.

Considerable interest was about this time excited in Europe by the experiments of Jacob Perkins, with steam artillery, exhibited for several years at the Adelaide Gallery, in London. In his exhibitions before the Duke of Wellington and eminent engineers, iron targets were shattered to atoms at thirty-five yards, and afterward the balls were shot through eleven one-inch planks of the hardest deal, placed in a line at a distance from each other, and balls were discharged at the rate of one thousand per minute.[1] Experiments were also made at Greenwich, before Prince Polignac and French engineers, but the engineers of both nations regarded the steam gun as practically useless, although displaying extraordinary ingenuity in the inventor.

1826 With the commencement of this year, the Franklin Institute, in Philadelphia, which already numbered about one thousand members, issued the first number of the Franklin Journal, now the oldest periodical in the United States devoted to the mechanical and manufacturing arts, and containing for many years the only record of American Patents as they were issued. It was published in monthly numbers at five dollars a year, and has continued to the present time, a valuable and leading repository of original and selected papers, theoretical and practical, in mechanics and the useful arts, being held in deserved esteem as well in foreign countries as in the United States. The several series of the work up to the close of 1860, comprise about seventy volumes of well digested matter relating to the progress of mechanical science in Europe and America.

The Maryland Institute, formed during the last year at Baltimore, through the exertions of J. H. B. Latrobe and others, for the benefit of the mechanical and laboring classes, was incorporated in the course of the present year, by the Legislature of Maryland. It continued in successful operation until 1835, when the library, apparatus, and other property, were destroyed by the burning of the Athenæum building, and the Society disbanded. In 1848 the new society was organized, and the present Institute was incorporated in 1850.

On the 3d March, the New England Society, for the Promotion of

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(1) "Five hundred balls per minute, shot,
Our foes in fight must kick the beam;
Let Perkins only boil his pot,
And he'll destroy them all by steam."
"STEAM, A POEM," *in the London Mirror, February*, 1825.

Manufactures and the Mechanic Arts, organized in the last year, by citizens of Boston, who were desirous to promote American Industry and talent wherever found, received a charter from the General Assembly of Massachusetts. It was empowered to hold public exhibitions of the products of American industry, and to award premiums for new and useful inventions, and for the best specimens of the skill and ingenuity of manufacturers and mechanics. All goods sold under its direction at the regular semi-annual sales, which were held in the Spring and Fall, were, by the act of incorporation, exempted from the auction duty, and an ordinance of the City Council granted the use of the halls over the Faneuil Hall Market, for the Society's fairs, free of expense. The first public sale was commenced on 12th September, and the amount received from the first five sales was nearly two millions of dollars. An exhibition was also held in October of this year, when fifteen medals were awarded, and twenty the next. A standing committee awarded premiums for new inventions, machinery, and experiments in chemistry and natural philosophy, tending to advance improvements in the arts. The common premium was an elegant silver medal, struck from highly finished dies, made by Mr. Gobrecht, an eminent artist of Philadelphia. The payment of two dollars admitted to annual, and twenty-five dollars to life membership. The Society exerted a favorable influence upon the progress of useful arts in their vicinity.[1]

In December, an association called the "Pennsylvania Society, for the Promotion of Manufactures and the Mechanic Arts, was formed at Philadelphia," a principal object being the spread of information on the subject of legislative protection.

A paper read before the Pennsylvania Society for the Promotion of Internal Improvement, January 10th, stated that there were thirty-five salt works upon the Connemaugh and Kiskiminetas, three upon the Alleghany, and many others in course of preparation upon these waters, one of them expected to yield fifteen hundred bushels daily. The wells were sunk from four to five hundred feet deep. The increase of the manufacture had been rapid beyond example, and improved transportation would enable the manufacturers to supply the middle and eastern parts of the state, with salt cheaper than the foreign. A steady market, it was believed, would insure 750,000 bushels per annum, or with the new well 1,200,000 bushels. The quality of the Pennsylvania salt was excellent, and daily improving. Its price was twenty to twenty-five cents per bushel at the works, and on the river had been sold as low as twelve and-a-half cents. Its price in the middle counties was one dollar

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(1) Bowen's Picture of Boston, p. 60.

to one dollar twenty-five, and the average quantity used there was estimated at half a bushel for each person. If a canal were cut, the salt makers would contract to deliver the best salt at forty cents a bushel in Harrisburg.

The New York Salines produced, in the last year, only 736,632 bushels, against 820,926 in 1825, but in the following year yielded 1,104,542.

The quantity of Salt made in the United States during the year, as stated in documents laid before the United States Senate, relative to the repeal of the duties, amounted to 4,113,000. The quantity imported for the year, ending 30th September, was 4,564,720, whereof 30,680 bushels were reshipped. The duties collected on the importation were $912,944. The price of Turks Island salt, in New York, was forty-nine to fifty cents. It cost in the British West Indies about eleven cents a bushel.

Huntingdon county, in Pennsylvania, contained at this time eight furnaces and ten forges, one paper mill, three powder mills, one hemp mill, one slitting and rolling mill, and one nail factory, in addition to grist and saw mills, distilleries, etc., etc. The rolling mill and nail works belonged to the extensive Tyrone works of Gloninger, Anshultz & Co.

Mr. Marcus Bull, on the 7th April, read before the American Philosophical Society, a memoir on Fuel, containing the result of his careful analysis and experiments upon the relative heating power, and other properties of different species of American woods. The practical value of his researches, extending altogether to forty-six different species, has been highly appreciated both in Europe and America.

In obedience to the resolution of the House of December 29th, Mr. Van Rensselaer, from the Committee on Agriculture, on the 2d May, presented a report on the expediency of encouraging, by legislative measures, the planting of mulberry trees, and the breeding of silk worms for the production of Silk. The committee stated that mulberry trees were indigenous in the United States, and that silk could be raised with facility. Measures had been recently adopted at Savannah to renew the culture, which had been suspended by the Revolution. Considerable sewing silk was at this time made in Kentucky, and the business was prosperous in Connecticut. The total value of silks imported in the five years, from 1821 to 1825, inclusive, was $35,156,494, of which $7,968,011, was exported. The exportation of breadstuffs, on the other hand, had fallen off from $20,374,000, in 1817, to $5,417,997, in 1825, in which year the silk imported reached the value of ten and a quarter millions of dollars! The committee submitted a resolution, which was adopted on the 11th, directing the Secretary of the Treasury to cause to be prepared, and laid before the House, early in the next session, "a well digested manual on the growth and manufacture of silk." The report of the Secretary, the late Richard Rush, was made in February, 1828, and six thousand copies of the report and manual were printed. This, with other measures soon after adopted by Congress for circulating information on the subject, first directed public attention strongly to the silk culture in the United States, which, for several years, was prosecuted with an enthusiasm probably unequalled in our industrial history, and which proved ultimately injurious to the object it was designed to promote. In the course of this year, Dr. James Mease of Philadelphia, to whom the preparation of the manual was intrusted by the Secretary, imported from Genoa the first Piedmontese silk reel for winding silk from the cocoons. It answered well, and the manufacture was commenced in Philadelphia by Mr. Tees and Mr. B. F. Pomeroy. During this year or the following spring, the first specimen of the Morus Multicaulis, or Mulberry of the Philippine Islands, was imported into the United States from Tarascon, near Marseilles, where it cost five francs, indicating the high value placed upon it even there. The plant—which had been first introduced into France in 1821 from Manilla, by Mr. Perottet, who gave it its botanical name—was planted in the Linnean Botanic Garden of William Smith & Sons, commenced in 1750, at Flushing, on Long Island, by a descendant of Governor Thomas Prince of Plymouth. Its qualities, however, first became known in 1829, through Mr. Gideon B. Smith, of Baltimore, and Dr. Pascalis, of New York, who wrote on the subject. Silk worms were this year reared in Massachusetts by Mr. Cobb, who soon after called the attention of the Legislature to the subject, and prepared, under its authority, a manual on the mulberry tree and silk culture.

The number of distinct factory buildings devoted to the cotton manufacture in New England, was estimated at four hundred, averaging seven hundred spindles each, or 280,000 in all. The new ones were very large, the old ones quite small. Each spindle was estimated to consume about one half pound of cotton daily, or 140 pounds per annum, which for 280 work-days, gave about 39,200,000 pounds, or 98,000 bales, as the annual consumption. About one third of the buildings employed power looms, one third hand looms, and the others spun yarn and twist for the Middle and Western States, where, as in Philadelphia, it was woven by hand under contract or in families. The factories were distributed about as follows: in Massachusetts, 135; Rhode Island, 110; Connecticut, eighty; New Hampshire, fifty; Maine, fifteen; Vermont, ten. The larger manufacturing villages, where much capital was employed, were the following, in the order of their size, viz.: Chelmsford (Lowell), Mass.; Somersworth, Dover, and Dunstable, N. H.; Pawtucket, R. I.; Fall River, Mass.; Blackstone, Mass.; Slatersville, R. I.; Taunton, Mass.; Pawtuxet, Kent county, R. I.; Ware and Waltham, Mass.; New Ipswich, and New Market, N. H.; Springfield and Lancaster, Mass.; Norwich, Conn. Large companies were forming at Saco, Maine; and Haverhill, Mass. Calico printing was carried on at Chelmsford, Taunton, and Pawtucket, and they were preparing to print at Ware, Dunstable, Somersworth, Dover, and elsewhere. They already printed in New England sixty thousand yards a week. One third of all the mills in New England, including all the new ones, had their machinery from the best models used in England. The new establishments had several inventions of their own, which saved one third the work in some processes, and which were not yet used in England. The number of cotton factories in all the other States, was estimated at 275, of the same average size, which would make the total consumption of cotton, 150,000 bales per annum.

The price of Cotton Machinery in the United States, which in 1810 was three to four hundred times as much as in England, and in 1820 was about double, amounted on an average at this time to about fourteen dollars per spindle, with the appurtenances, or fifty to sixty per cent. more than in England. Spindles of the throstle kind were made for about eight dollars each, those of the mule kind for less.[1]

The Hudson Calico Print Works, at Columbiaville or Stockport, five miles above Hudson city, N. Y., were established this year on a small scale, by Joseph and Benjamin Marshall. One printing machine, a small dye-house and bleachery, sufficient to print about three hundred yards daily, were increased in 1828, by the importation from England of three more printing machines, with steam dyeing appurtenances, etc.; and in 1836 the print works of Marshall, Corville & Taylor, employed 250 hands, and printed on an average eighteen thousand yards daily, or 5,400,000 yards annually, worth eighteen cents a yard, of good permanent madder colors. Their madder dye-house, two hundred and eighty-six by fifty feet, was probably the largest ever built for that purpose.

The Cohoes Company, of New York, was incorporated in March, with a capital of $250,000, afterwards increased to $500,000, to improve the immense water-power at the Falls of the Mohawk, on the Erie canal, eight miles north of Albany. They built a dam and canals, which made the whole fall of 103 feet available for mill sites five times at five different levels, which have since been occupied by extensive cotton, iron,

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(1) Report of Secretary Woodbury.

and other manufactures, to the value now of nearly two millions annually.

In the returns for this year, the values of domestic cotton goods exported are given for the first time, and were as follows, viz.: white piece goods, $821,629; printed goods, $68,884; Nankeen, $8,903; twist, yarn, etc., $11,135; all others, $227,574; total, $1,138,125. Of the white goods, the value of $671,266 was sent to South America, Central America and Mexico.

The manufacture of Cotton Bagging was at this time attempted at Nashville, Tenn., by a Mr. Allen, who received a contract from some gentleman of Huntsville, for twenty-five thousand yards. Mr. Rapp, of Economy, Pennsylvania, also received a commission from Adams county, Mississippi, for twenty thousand yards, at twenty-three cents a yard. Premiums were offered in the same county, for cotton cordage, cotton bagging, blankets, and negro clothing. The large factories of hempen bagging at Lexington, Paris, Danville, Shelbyville, and other towns in Kentucky, almost exclusively employed negro operatives, few others being seen, except managers and machinists.

The manufacturing establishments of Cincinnati, which had greatly increased within two years, embraced five steam engine and finishing shops, with 126 hands; four iron foundries, fifty-four hands; eleven soap and candle factories, forty-eight hands (making 451,000 pounds of soap and 332,000 pounds of candles); ten tanner and currier shops, sixty-six hands; thirteen cabinet furniture shops, 104 hands; four ropewalks, thirty-one hands; two breweries, eighteen hands; seven hatters' shops, ninety-five hands; twenty-nine boot and shoe shops, 257 hands; two wall paper factories, nine hands; six chair factories, thirty-eight hands; one type foundry, twenty-three hands; one clock factory, eighteen hands; three plough factories, eleven hands, two woolen and cotton factories, six hands; two cab factories, six hands; one chemical laboratory; one paper mill, forty hands; fourteen brickyards, 210 hands (10,000,000 of bricks); one white lead factory, eight hands; three steamboat yards, two hundred hands; nine printing establishments, and numerous other factories and machine shops, whose aggregate manufactures amounted to the value of $1,850,000.

The Printing-offices issued during the year, in addition to about one hundred and seventy-five thousand newspapers, nearly two hundred thousand copies of pamphlets, almanacs, school and other books, etc. The whole number of steamboats that had been built there since 1816, was fifty-seven, whose total tonnage was 10,647 tons, of which seventeen boats, with a tonnage of 3,139, were constructed the present year. There were, at this time, 143 steamboats, carrying about twenty-four thousand tons, running upon the western waters. Of these, forty-eight were built at Cincinnati, thirty-five at Pittsburg, ten at New Albany, seven at Marietta, five at Louisville, four at New York, and the others at different places on the Ohio, the engines for which were nearly all furnished by Cincinnati and Pittsburg. The imports of Cincinnati for the year, amounted to $2,528,590, and the exports to $1,063,560.[1]

The first Railroad constructed in America, was built this year from the granite quarries of Quincy, Mass., to tide water on the Neponset river, a distance of three miles, having a single track and one inclined plane 275 feet in length. Pine rails were laid and covered with oaken rails, and these with iron plates three eighths of an inch thick. It was used only for transportation of granite. On the 8th January following, the Mauch Chunk railroad, nine miles in length, for the transportation of coal from the Summit mines to the landing on the Lehigh, was commenced and finished in about three months at a cost of $3,500 per mile. Both roads went into operation in 1827, and were the commencement of railroad enterprises in the United States. The Hudson and Mohawk railroad, between Albany and Schenectady, was also chartered this year, and the Baltimore and Ohio Railroad in February of the next year.[2]

An Electric Telegraph was erected on Long Island, in New York, by Mr. Harrison Gray Dyer, who used frictional electricity and dyed marks on chemically prepared paper, by means of electric sparks.

Patent or Japanned Leather, was about this time made in Newark, N. J., by Mr. Seth Boyden, an ingenious citizen, who obtained letters patent for several improvements in manufactures. He erected a factory for making Patent leather, which he was probably the first in the United States to make. Mr. David Crockett commenced the business a few years after.

The first manufacture of Palm Leaf Hats in this country, was commenced this year in Massachusetts. The material was imported from Cuba and was made up chiefly by young girls. The manufacture in 1831, reached the number of two millions, nearly one half of which were made in Worcester county. They are still somewhat extensively made in Shutesbury and many other towns, and form a large item in the export trade of Boston.

The manufacture of Axes and other edge tools, was commenced at Hartford, Conn., by the brothers Collins, under the style of "Collins

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[1] Drake and Mansfield's "Cincinnati in 1826," 64–66, 74–76.

[2] The Stockton and Darlington Railroad in England, opened on 26th September, 1825, was the first passenger railroad ever built to the extent of twenty-five miles. It used edge rails, and employed locomotives, stationary engines and horses.

& Co.," still retained on their celebrated wares. They were the first to supply the markets of this country with cast steel-axes, ready ground for use. The manufactory was soon after removed to its present locality, on the Farmington river, where it has since been carried on extensively, under a charter, by the "Collins Company," with labor-saving machinery, much of which was invented, patented and constructed, by themselves. Their axes soon altogether superseded the foreign article.

At the Exhibition of the Franklin Institute this year, there was a pair of scissors, of Philadelphia manufacture, which weighed only one fifth of a grain, showing the improved dexterity of her mechanics. A Lace dress was made in Pawtucket, R. I., which took there a premium of ten dollars, and was afterwards purchased by the President of the United States, showing the progress of the finer manufactures.

The total capital employed in manufactures was estimated at $156,500,000, of which, $30,000,000 was given to Pennsylvania, $28,000,000 to New York, and $26,000,000 to Massachusetts. It included every species of manufacture, except food, in which the capital was estimated at $200,000,000.

At Middletown, Conn., where Swords of fine quality had been made for many years, Mr. Nathan Star made several, considered almost equal in temper to the famous "Damascus Blades." They were presented to Generals Jackson, Gaines, Johnson, and Commodore Hill.

PATENTS.—David H. Mason, Philadelphia, January 26, ornamental rolls and stamps for bookbinders; John S. Gustin, New York, February 23, power loom for weaving wire; Daniel Treadwell, Boston, March 2, power printing press—this press was about this time in operation in the office of the "National Intelligencer," and was considered by the proprietors, Messrs. Gales & Seaton, one of the most valuable discoveries ever conferred upon the art. It was said to be the only press on the cylindrical principle, adapted to book printing, which it executed in the most beautiful manner. Wm. Hoyt, Brookville, Indiana, March 3, cast-steel triangular bells; Jessie Delavo, New York, March 7, wrought iron fireproof chests; E. Nott, Schenectedy, N. Y., three patents, March 23, June 21, and December 29, for the evolution and management of heat, which was the subject of five subsequent patents by the same person, and covered the construction of Nott's highly popular and beautiful stoves. Benjamin Bull, New York, June 20, machine for weighing canal boats; W. Hunt & W. Hoskins, Martinsburg, N. Y., June 22, machine for spinning flax and hemp. This machine, invented by the late Walter Hunt, whose patented and other inventions and improvements were very numerous, was the result of numerous experiments made to revolutionize the flax manufacture, as that of cotton had been by labor-saving machinery, and came nearest to the object of any introduced up to that time. John M. Brookings, Wiscasset, Maine, June 28, and several others, machines for moulding and pressing bricks; Henry Bostwick, New York, August 2, representing genealogy and chronology by lines; Joseph Eve, London, England, August 16, improvement in steam engines. Eve's steam engine, for which he obtained a patent in 1818, while a resident of Georgia, excited considerable interest in England for its novelty, having no parts in common with ordinary engines, "no cylinder, piston, valve cock, fly wheel, crank, condenser, or reciprocating parts whatever." It was rotary and high pressure, and was impelled by the direct impulse of the steam acting on surfaces at right angles with the motion, securing its whole power under favorable circumstances. D. Collings & J. D. Galup, Wilkesbarre, Pa., October 12, generating steam by Anthracite; Wm. G. Berry, and J. T. Osborn, Cincinnati, Ohio, November 26, a locomotive steam saw mill; Isaiah Lukens, Philadelphia, December 30, improvement in the lithontripter. A patent was granted in England on 15th September, 1825, to Mr. Lukens, machinist, of Adams street, Adelphia, County of Middlesex, "for his new invented surgical instrument, for destroying the stone in the bladder without cutting, which he denominates lithontripter." This valuable surgical instrument appears to have been the invention of an American.

In the expectation that a permanent system of adequate protection to domestic industry, would be engrafted upon the national policy, and in consequence of the tariff of 1824, which raised the duties upon woolen goods from twenty-five up to thirty-three and one third per cent., a large amount of capital had, during a number of years past, been attracted to the Woolen Manufacture. Enterprise had been still farther invited into that and other branches of manufacture on account of the depressed state of the foreign commerce, and of agriculture resulting from the low price of American staples in the markets of Europe, to which may also be added a general improvement in the financial condition of the world. The augmentation of the duty on imported woolens, was, however, immediately followed in Great Britain by a reduction of the duty upon foreign wool from six pence to one penny per pound (and soon after to one halfpenny), for the acknowledged purpose of enabling the British woolen manufacturer to send his goods into the United States at a reduced cost. As a consequence of the combined foreign and domestic competition, increased in the former case by the great improvements in machinery, the low price of wool in

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Europe, and the revulsion of 1825, which stimulated the exportation of woolens, under the various devices employed for evading the duties and breaking down the American manufacturer, the woolen interests at this time, as well as the agricultural branches connected with them, found themselves suffering under the severest depression and unable to struggle with the various adverse influences by which they were surrounded. The amount of capital employed in woolen manufactures, had increased since the peace, from ten millions to fifty millions of dollars in the present year. A corresponding increase had taken place in the number of sheep raised, and in the production of wool, which found a ready sale so long as the manufacturer was prosperous. But by the ruin of the woolen manufacturer, or the suspension of the mills, which at this time threatened to become general, the farmer found himself without a domestic market for his wool or his breadstuffs, at the same time that he was deprived of a foreign market for his products. Numerous memorials were in consequence sent up to the nineteenth Congress, at its second session, from the manufacturers and farmers of different sections of the Union, asking its interposition to save those valuable interests from total overthrow, and to raise up a domestic market for the perishing and unsalable production of the soil, by a revision of the tariff. With a view of securing to the manufacturer of Woolens, and to the country, the benefits intended by the act of 1824, and which had accrued both to the manufacturer and consumer of coarse cottons, under the minimum duties of 1816, whereby foreign low-priced cottons were wholly excluded, and a greatly superior article was supplied by our manufacturers at about one half the former price, Mr. Mallory of Vermont, from the Committee on Manufactures, reported on the 10th January, a bill having especial reference to the protection of that branch. The bill left the rate of duties unchanged on woolen manufactures, but all manufactures of wool, except worsted stuff goods and blankets, whose actual value at the place whence imported was less than forty cents, between forty cents and $2.50, or between $2.50 and $4 per square yard respectively, were to be deemed and taken to have cost those prices. All unmanufactured wool then chargeable with a duty of thirty per cent. ad valorem, was to pay thirty-five per cent. during the first year, and after 1st June, 1827, forty per cent. ad valorem, with a minimum valuation of forty cents per pound on wool costing between ten and forty cents. Having been taken up in Committee of the Whole, on 17th January, Mr. Mallory advocated its passage as alike demanded by the prostrate condition of the manufacture and as a benefit to the agricultural interests. He estimated the capital employed in the woolen branch to be at least forty millions, giving employment to sixty thousand persons, and the capital devoted to wool growing at as much more. The number of sheep was estimated at fifteen to sixteen millions. The principal causes of the present depression which the bill sought to remove, were the evasion of duties under the ad valorem system, by means of foreign agents residing in the country, to whom unfinished goods were consigned at a low valuation, and finished by foreign workmen in their employ in this country; the irregularity of the market in consequence of sudden influxes of foreign goods; the credits on duties; sales at auction; and the practice of the manufacturer, always to sell his surplus stock in this country, rather than depress his own market when compelled to sell at reduced prices. The bill was opposed by Mr. Cambreleng, of New York, who declared that it was an attempt to levy a duty of two hundred per cent., disguised under the minimum rule as one of thirty-three and one third per cent. only, and that it would be in effect entirely prohibitory of coarse woolen goods, much needed by the poorer classes, for the benefit of manufacturers, who were suffering only from a reaction of trade, the result of their own over-speculation and production. After further opposition from Mr. Buchanan of Pennsylvania, who favored protection as in 1824, but was opposed to this bill, and from Messrs. Mitchell, Hamilton, Drayton, and McDuffie of South Carolina, Archer of Virginia, and others, and having received the advocacy of Messrs. Tristram Burges of Rhode Island, Dwight and Davis of Massachusetts, Stewart and Ingham of Pennsylvania, and many others, the bill in an amended form passed the House on the 10th February, by a vote of one hundred and six to ninety-five. It failed, however, to become a law, having on the 28th, on motion of Mr. Hayne, been laid on the table in the Senate, by the casting vote of the Vice President, chiefly in consequence of its late introduction and want of time to discuss it.

The failure of the Woolens bill was immediately followed by efforts on the part of manufacturers, to secure, by combined and systematic action, an early attention at the next session of Congress to the important interests which appeared to be consigned to inevitable ruin. A convention of delegates from the friends of domestic industry in thirteen New England and Middle States, assembled at Harrisburg, Pa., on the 30th July, when the subject was fully discussed. A memorial drawn up by C. J. Ingersoll, was presented and adopted, and having been laid before the next Congress, with the draft of a bill containing a higher schedule of duties, resulted in the passage of a new Tariff act, giving a greater measure of protection to the manufacturing interests, although an increase of duties was opposed by an elaborate and able report of a committee of citizens of Boston, published November 30, of this year.

On the 6th of August, a Convention of Commerce between Great

Britain and the United States was signed at London, whereby the provisions of the commercial treaty of July 3, 1815, which had been continued for ten years by the convention of 20th October, 1818, were again continued and extended indefinitely.

A remonstrance from Massachusetts against a bill for the repeal of the duty on foreign Salt, which passed the Senate on 5th February, stated that the manufactories were numerous along the sea coast of that State, and employed upward of one thousand persons, producing annually six hundred thousand bushels of the best salt. In Barnstable County alone, there were fifteen million feet of vats, worth $1,300,000. The duty of twenty cents a bushel, imposed in 1813, had revived and extended the manufacture, and within three years past the domestic and foreign competition had reduced the price about thirty per cent. It had been as high as sixty cents a bushel, but was now sold for thirty-three or thirty-five cents, which was less than it could be afforded. The total salt manufacture of the Union was estimated at 4,151,182 bushels, of which about one fourth, or 1,104,452 bushels, was made in New York, and 929,848 in Virginia.

The general introduction, about this date, of grates and furnaces for burning Anthracite coal, considerably increased the coal trade of Pennsylvania, which was still more promoted by the completion in the spring of this year, of the Mauch Chunk railroad and the use of rail cars drawn by mules in the "drifts" of the coal mines.

The General Mining Association, sole lessees from the creditors of the Duke of York, of the immense bituminous coal fields of Nova Scotia, at the same time commenced operations at Sydney, in Cape Breton—where coal had been mined on a small scale for sixty years—and at the Albion mines in Pictou.

The Boston Mechanics' Institute was incorporated June 15, for the promotion of science and the useful arts by lectures and other means. A course of lectures was commenced three weeks after its organization, and a second course in November, and it numbered among its early lecturers such men as Messrs. George B. Emerson, Professors Farrar and Webster, Daniel Treadwell, Edward Everett, Dr. John Ware, Dr. Bigelow, and others.

On June 25, there were in Philadelphia and its vicinity, one hundred and four warping mills at work, sufficient to employ forty to fifty weavers each, or forty-five hundred in all, over two hundred dyers, three thousand spoolers, two thousand bobbin winders. Weavers, dyers, and warpers, could average five dollars per week in wages, and spoolers fifty cents to one dollar and a half, and bobbin winders one dollar and found. The manufacturing establishments were over fifty, at an average rental of one hundred and eighty dollars; the houses occupied by weavers about fifteen hundred, at sixty to eighty dollars; indigo used weekly, twenty-two hundred pounds; flour used as sizing, thirty to forty pounds; the goods produced daily were eighty-one thousand yards, at an average value of sixteen cents a yard. The whole wages of operatives amounted to $1,470,000 per annum; rents to $114,000; indigo at two dollars per pound, $228,800; flour for sizing to $9,100; and the goods manufactured to 24,300,000 yards, worth at sixteen cents, $3,888,000, and requiring, at four yards to the pound, 6,075,000 pounds, or 20,250 bales of cotton, equal to sixty-nine bales per diem, and worth at ten cents, $607,500 per annum. The goods were ginghams, checks, bedtickings, and stripes, which were exported in large quantities, to supply as well the Eastern and Western as the Southern States, many being sent to Boston by every packet.[1]

The City of Paterson, N. J., had become, in consequence of its manufactures, a place of 6,236 inhabitants, with seven houses of public worship, seventeen schools, a philosophical society, fifteen cotton factories, employing 25,998 spindles, and two duck factories, with 1,644 spindles, besides extensive machine shops and iron works. Its manufactories employed 1,453 hands, whose annual wages were $221,123. They consumed six thousand bales, or 1,843,100 pounds of cotton, 620,000 pounds of flax, 1,630,000 pounds of cotton yarn, and 430,000 pounds of linen yarn were spun, besides 630,000 yards of linen and duck, and 3,354,500 yards of cotton cloth. New factories were in progress of erection.[2]

The first importation of United States Cotton into Genoa was made this year by the house of Antonio & Andrea Ponti, proprietors of the oldest and largest cotton mill in Lombardy, established in 1810. It was purchased in New Orleans by a member of that house, one of whom afterward resided eleven years in the United States, and greatly increased the exportation of American cotton to the Mediterranean.

The total consumption of Cotton in the United States was estimated at 103,482 bales. The demand for American domestic cottons in Brazil, was considerably affected by imitations of them made in Manchester, and offered there at lower prices, although they could be made as cheaply in the United States as the same quality could be produced in that city. The progress of the cotton and woolen manufacture in the United States was a subject of some anxiety in England, and the Leeds Mercury about this date, stated that the Americans had even succeeded in applying the power loom to the woolen manufacture, "in which the English have hitherto failed."

During this, or the following year, subscriptions to the requisite amount

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1) Hazard's Register of Pennsylvania, vol. 1, p. 16.

(2) Gordon's Gazetteer. Montgomery on the Cotton Manufacture.

were made, for the establishment of the first Virginia cotton factory, at Petersburg, where ample power was afforded by the falls of the Appomattox. Two large cotton mills were afterward erected at Matoaca, on the north bank of the river, four miles above Petersburg. A company for the manufacture of cotton and woolen cloths, and linens, was also about this time projected by the people of Fredericksburg and Falmouth.

The value of Flannels, made by three mills in the vicinity of Newburyport, Massachusetts, for one year, was estimated at $684,000.

The number of incorporated manufacturing companies in Massachusetts, at this time, was one hundred and sixty-one, with capitals varying from $20,000 to $650,000. The whole amount of capital was $21,465,000.

The Bobinet factory at Ipswich, which had employed eight hundred young women in lace work, was compelled to discontinue operations, on account of the British manufacturers having so much improved their machinery as to undersell them. A new Net factory was, however, about to be started at that place. A Lace school at Newport, R. I., also employed about five hundred young women.

In Windham and Tolland counties, in Connecticut, the following quantities of Silk were made this year: Mansfield, 2430 pounds; Chaplin, 550 pounds; Ashfield, 500 pounds; Hampton, 467 pounds; Coventry, 350 pounds; total, 4,297 pounds, worth four dollars per pound. It was made in several other towns, from which there were no returns. Two attempts made, during the last and present years, by the Messrs. Terhoeven, near Philadelphia, to rear two crops of worms in a season, proved failures, although two crops had been produced at Bethlehem in 1825, by Messrs. Weiss & Youngman. The Messrs. Terhoeven, brothers, about this time invented a simple and ingenious machine for winding silk from the cocoons, and for doubling and twisting at the same time—operations believed to have never before been united in the same machine. It gave perfect satisfaction, and the inventors were awarded a medal and twenty dollars, from the fund left by John Scott, of Edinburgh, to the corporation of Philadelphia, for the distribution of premiums "to ingenious men and women, who make useful inventions and improvements."[1]

A manufactory of Ingrain or Kidderminister carpets and shawls, was carried on at Tariffville, Connecticut, by an incorporated company, under the direction of H. K. Knight; some of its productions were considered elegant, and four years after, it employed a capital of $128,000 and ninety-five male weavers.

The first Lithographic establishment in the United States was this

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(1) Rush's Manual, pp. 26, 39, 178.

year established at Boston, by Wm. S. Pendleton, who imported artists and materials from England, and produced portraits, music titles, and other beautiful specimens of the art, with great facility and correctness.[1]

A large manufactory of American China or Porcelain was in successful operation at Philadelphia. It was owned by William Ellis Tucker, whose warehouse was at 40 North Fifth street, and who was believed to be the only person who had brought the domestic manufacture of China to any considerable degree of perfection. A company of English artificers, this year, established the same business near Pittsburg, where suitable clay was found. A porcelain factory at Jersey City, near New York, was also said to be doing well. It employed one hundred persons and $200,000 capital. A glass factory, of the same size, was in operation there, and a carpet factory, making twenty-five hundred yards weekly.

Stained glass of fine finish and design, was also made in considerable quantity in the vicinity of New York. Glass decanters of great beauty and solidity were made at Wellsburg, Va., where white, flint, and green glass wares, within a few years, rivalled the foreign.

The first Bell made from blistered bar steel, or cast steel, melted, was manufactured this year at the works of the New York Steel Manufacturing Company, in New York city, under the superintendence of a gentleman from Baltimore, who was said to have a patent. It was equal in sound to composition bells, and could be made as light as they at a cost of twenty to twenty-five cents per pound. The West Troy bell foundry, of A. Meneeley's Sons, was established about this time.

Orders were this year received from France and England, for some of the card making machines, invented by Mr. Whittemore of Cambridge. The English machinists are said to have been unable to put them

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(1) This enterprise appears to have been immediately successful, and having passed through different hands, was recently owned and conducted by S. W. Chandler & Brother, at 204 Washington street. The second lithographic establishment was the next year attempted at Philadelphia by Kennedy & Lucas, but for want of practical printers, soon ceased, and was followed, near the same time, by the third establishment, started in the same city by Messrs. John Pendleton, Kearney & Childs, who employed as draughtsmen the late Rembrandt Peale, the eminent portrait painter, and Mr. Swett. Mr. Pendleton soon after left, and set up the first lithographic house in New York, and the fourth in the Union; while in Philadelphia, the business was continued by C. J. Childs and H. Inman, the latter also a painter of great merit. In about two years, Mr. Lehman took the place of Mr. Inman, and Childs & Lehman conducted it until 1834, when P. S. Duval, their printer, succeeded Mr. Childs, under the firm of Lehman & Duval, and in 1836 the former retired, leaving Mr. Duval sole proprietor of the business, which he has since conducted.

together when they arrived, and the persons ordering them were obliged to send to Boston for an American machinist.

Mr. Richardson, of Baltimore, this year constructed a steam flouring mill, on the American plan, for the Netherlands.

PATENTS.—Isaac Tyson, Baltimore, February 15, making copperas; John Sitton, Pendleton, S. C., February 15, and Cyrus W. Beach, Schoharie, N. Y., March 16, wheelwrights' assistant; William A. Hart, Fredonia, N. Y., Feb. 20, Marvel Davis, Mayville, N. Y., July 10, and Joseph Shattuck, Jefferson county, Ohio, Nov. 10, all for percussion gun locks, and John Ambler, jr., New Berlin, N. Y., Oct. 16, lever percussion lock; David Myerle, Philadelphia, March 3, machinery for laying ropes; Robert Groves, Brooklyn, N. Y., July 25, making cordage. [Messrs. Tiers & Myerle, of Philadelphia, purchased afterward the patent of Mr. Groves, originally taken out seven years before, and established a large factory for the manufacture of cordage on a new principle; the threads being placed on different revolving spools, passed through perforated cast-iron plates, and then through a cast-iron tube of suitable diameter for any sized rope. D. Myerle & Co., also established a large steam rope factory at Wheeling, Va., and another, fourteen hundred feet long by twenty-five wide, at Louisville, and others, we believe, at Cincinnati and St. Louis. His machinery was also used at Pittsburg and elsewhere, and was a valuable mprovement.] Oliver Ames, Easton, Mass., March 5, making shovels; Lemuel Hedge, Windsor, Vt., June 20, engine for dividing scales, which was adapted for stamping Gunter's scales; Denison Olmsted, New Haven, Ct., July 21, making gas light from cotton seed; Simeon Brown, N. Y., July 31, removing buildings with chimnies, furniture, etc.; Horace Baker, North Salem, N. Y., August 30, loom for weaving figured goods; John Robinson, Pittsburg, Pa., Nov. 14, glass knobs pressed at one operation; John McClintic, Chambersburg, Pa., Oct. 8, mortising and tenoning machine: this, though not the earliest patent, is regarded as the first practical contrivance of the kind, and the parent of the foot mortising machine for wood, since universally adopted in workshops, and the subject of numerous patented improvements. Charles Miner, Lynn, Ct., Oct. 12, and Nov. 16, raising ships, etc., by cradle screw; David H. Mason and M. W. Baldwin, Philadelphia, October 30, biting figures on steel cylinders for printing calicoes; Nathaniel Bishop, Danbury, Ct., Nov. 17, rolling the backs of tortoise shell combs.

Jacob Perkins patented in England, March 22, a steam engine and tubular boilers.

The excitement which had for several years agitated the whole country on the subject of legislative protection to domestic manufac-

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tures, received intensity in consequence of the organized effort of the manufacturers to influence Congress, through the Harrisburg Convention held in July of the last year, following the defeat of the Woolens Bill in the Senate. The hostility of the planting interests of the South, to an increase of duties on imports, with a view to encouraging manufactures, as being sectional, oppressive to themselves, and likely to produce retaliating discriminations against their great staples, in addition to its being a tax upon the consumer, had gathered strength at each attempt to remodel the tariff since 1816. An increasing degree of asperity was manifested in the South, on the subject of protection, and amid the severe denunciations, and counteracting efforts, which were fast making the question of prohibitory and protective duties a principal issue between the great political parties of the country, the twentieth Congress assembled in its first session on 3d December of the last year. The continued distress of the woolen manufacturers, who had been fast sinking under foreign competition, or with very few exceptions had barely sustained themselves in the hope of some permanent measures for their relief, and the equally depressed condition of the iron interests, produced, on the 31st December, a resolution of the House, empowering the Committee on Manufactures "to send for and examine persons on oath, concerning the present condition of manufactures, and to report the minutes of such examination to the House," preparatory to a revision of the tariff. Subpœnas were issued and numerous witnesses were examined relative to iron, wool, woolens, steel, paper, glass, hemp, flax, sail duck, shirts, and cotton cloth.[1]

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(1) On the subject of wool and woolens, the following proprietors and representatives of leading establishments, were examined by the committee, viz.: Simon A. Dexter, of the Oriskany Manufacturing Company, Whitesboro', N. Y., commenced 1810, making kerseymeres and broadcloths; Hon. A. Tufts, of Tufts' Manufacturing Company, Dudley, Mass., commenced 1824, capital $40,000: loss, exclusive of interest, in eighteen months, $5,000; Col. James Shepherd, of Shepherd Woolen Manufacturing Company, Northampton, Mass. (the largest in the United States), capital $130,000, made broadcloths and cassimeres: lost in two years about $30,000; Wm. Phillips, of Phillipsburg Factory, Walkill, N. Y., capital $20,000, broadcloth; Abraham Maitland, Andover, Mass., capital $42,000, flannels altogether, to amount of 3,200 pieces in 1827, with improving sales; Wm. W. Young, Brandywine, Del., commenced 1813, capital $100,000, blue cassimeres and coarse wool satinetts, losing business since 1825; William R. Dickerson, Steubenville, Ohio, commenced 1815, capital $100,000, six to seven-quarter broadcloths and some flannels: losses in three years about $8,000; A. Schenck, Glenham Company, Matteawan, N. Y., incorporated 1824, capital $91,531, broadcloths: lost in 1826–7, $5,500, and in 1825–6, $1,795: made also, machinery in last year to amount of thirty or forty thousand dollars, which was a profitable business; James Wolcott, Jr., of Wolcott Woolen Manufactory, South Bridgewater, Mass., incorporated seven years before, capital $126,000, broadcloths, principally indigo-blues, stock depreciated fifty per cent.: lost in 1826 $23,095, exclusive of interest on

The Committee, acting upon the evidence thus obtained, made a report, of which six thousand copies were printed, and accompanied it by a bill drawn up by Mr. Silas Wright of New York, and framed with especial regard to the protection of the woolen manufacturer, wool grower, and farmer, and the producer and manufacturer of iron, by encouraging the consumption of domestic materials in preference to foreign, and giving to both the command of the home market. Mr. Mallory, chairman of the committee, through whom the bill was reported and called up in Committee of the Whole on the 4th March, explained its provisions, and forcibly argued in favor of protection, while he disapproved of some of

capital, not paying expenses; Jonas B. Brown, of Goodall Manufacturing Company, Millbury, Mass., capital $80,460, broadcloths and satinetts: latter a losing business; Joshua Clapp, Litchfield, Conn., also a factory at Northampton, Mass., uses his factory rent free, made broadcloths: lost in 1825–6, $8,995, including commissions, and in 1826–7, $3,895; Benjamin Poor, of Saxon and Leicester Factories, Worcester and Middlesex counties, Mass., capital $150,000: loss to July, 1827, $26,394; Elenterre Irene Dupont, near Wilmington, Del., capital over $70,000, coarse cloths and kerseys for the army of common country wool, and of coarsest country wool linseys for negro clothing—business always being a losing one; Joshua W. Pierce, Salem Falls Manufactory, Souerswitt, N. H., capital, in November, $362,000, broadcloths only: profits in 1825, $6,772, losses in 1826, $17,059.

In these factories the aggregate amount of wool consumed was 716,559 lbs. It was stated that purchasers generally preferred English goods—they complained especially of the dyes of blue cloths, the others being as good as English. The prejudice excited against American cloths by foreigners was equal to twenty-five per cent. against the manufacture. The manufacturers considered that they could make cloths as cheaply as the English, wool being of the same quality and price. More female labor and machinery were used here than in England. Four fifths of the consumption of woolens was of American manufacture, and the whole amount was estimated at $50,000,000 annually. Small establishments and medium capital answered better, under their sole proprietors, than incorporated companies. Manufacturing was considered favorable to morals, as the education of children was attended to in most of the large factories, particularly by Sunday-schools. The best wool, say half to full-blood merino, was preferred, but for negro cloths the coarse Smyrna and South American wools were employed. Fine and coarse wools were imported from Germany, Spain, Portugal and England, and coarse from Smyrna, Adrianople and Buenos Ayres. They varied much in price—Saxony cost sixty-one to one hundred and sixty cents; Spanish, thirty-five to eighty-five; Merino, thirty to one hundred and twenty-five; Italian, thirty-two and a quarter; German coarse wool, sixteen to twenty; Russian, thirteen; Smyrna, sixteen to twenty-two; spring wool, thirty to forty-one; pulled wool, thirty to thirty-five; common domestic (native), twenty to twenty-five cents. [Its price has depreciated since 1852, twenty-five to thirty-three and one third per cent., owing to the depressed state of the manufacture, that which cost seventy-five now selling for fifty to fifty-five. It was still fifty to seventy-five per cent. higher than in England. A lot sold in New York in October last for seventy-six cents, which cost in London two shillings and one pence, or forty-six cents, and a lot purchased in Boston at fifty cents was valued in London at twenty-three and one half cents. Wool, costing twenty to seventy-five cents, was about half the price of the plain cloth. There was no wool more suitable for blankets than native wool, but its price had always been too high.]

the details of the bill, especially the duty on certain kinds of wool, as positively injurious to the manufacturer and of no advantage to the farmer. The bill proposed to increase the duty on hammered iron, from $18 to $22.44, and on rolled iron from $30 to $37 per ton, making the first equal to about sixty-seven per cent. and the latter one hundred and twenty-one per cent.; on pig iron, from fifty to sixty-two and a half cents per cwt., and increased the duty on wire one cent per pound, on hardware ten per cent., and on steel from one to one dollar and a half per cwt. Upon wool and woolens, which were the great interests regarded by the bill, as suffering most from the low price of foreign wool, auction sales, credits for duties, and various defects of the revenue system, the following duties were proposed: on unmanufactured wool, seven cents per pound (reduced to four cents),with an addition of forty per cent. and an annual increase of five per cent., until it reached fifty per cent. ad valorem. Manufactures of wool (except carpets, blankets, worsted stuff goods, bombazines, hosiery, mits, gloves, caps, and bindings), the actual value of which, at the place whence imported, was not over fifty cents, were to pay sixteen cents the square yard—changed to an ad valorem duty of forty per cent. until 30th June, 1829, and forty-five per cent. thereafter on a minimum valuation of fifty cents. On woolens valued between fifty cents and one dollar per square yard, a duty of forty cents; on those between one dollar and two dollars and a half per yard, one dollar. Those costing between two and a half and four dollars, were to be taken to have cost four dollars and pay forty per cent. ad valorem. Woolen blankets having nuts, etc., thirty-five per cent. These rates were finally changed to a uniform duty of forty per cent., until 30th June, 1829, and forty-five per cent. thereafter, on the first three classes, with minimum valuations respectively, of one, two, two and a half, and four dollars the square yard; and woolens costing over four dollars per yard, were to pay forty-five per cent. before and fifty per cent. after the above date; ready-made clothing fifty per cent.; Brussels, Turkey, and Wilton carpets and carpetings, seventy cents; Venetian and ingrain carpetings, forty cents; other carpeting, thirty-two cents; patent floor cloth, fifty cents a yard, etc. On unmanufactured hemp and flax, forty-five dollars per ton, and five dollars per ton additional per annum, until it reached sixty cents; and sail duck nine cents the square yard, to which was added four and a half cents the square yard on cotton bagging, and after June 1829, five cents. On molasses, ten cents per gallon, and on distilled spirits, ten cents in addition to the existing duty, altered to fifteen cents. The bill having been thus amended and discussed, passed the House on the 21st April, by a vote of one hundred and five to ninety-four, and was sent to the Senate, where it received farther amendments, which were agreed to by the House. Mr. Benton proposed an annually increasing duty on indigo until it reached one dollar per pound. It was advocated by others but opposed by Mr. Hayne of South Carolina, who was unwilling that the South should participate in the American system, and the duty was fixed at an increase of five cents the first year, and ten cents annually afterward up to a maximum duty of fifty cents a pound. A duty of thirty per cent., and after June 1829, an additional duty of five per cent. on all silks beyond the Cape of Good Hope, and of twenty per cent. on other manufactures of silk, was added to the bill.

Duties of four to nine dollars per ton on roofing slates, and of thirty-three and one third per cent. on school slates, were also added by this bill, and the minimum value of cottons was raised to thirty-five cents the square yard.

Under the minimum principle, which was now applied generally to woolen manufactures, the five several grades of woolens paid respectively, at the rate per yard of fourteen, twenty-two and a half, forty-five, one hundred and twelve and a half, and one hundred and eighty cents per yard. But the increased duties upon woolens which gave to this measure the name of the High Tariff, were materially modified in their effect by the high duty on wool, which, as originally reported, would have effectually counteracted its benefits to the manufacturers of coarse wool—an article extensively imported but not produced in the country.

The act, which was to go into immediate effect after the 30th day of June, notwithstanding strong remonstrances from the Legislature of South Carolina and from unofficial sources, and various efforts to defeat it, finally passed the House on the 15th May, when the last of the Senate's amendments was agreed to by a vote of one hundred and twenty-two to sixty, and it became a law on the 19th.[1] It was the first act regarded by the manufacturers as really protective of their interests, and greatly promoted the growth of certain branches.[2] No protection was asked for manufactures of glass, paper, or iron, except hammered bar iron. On the 5th January Mr. Rush, Secretary of the Treasury, in obedience to a resolution of the House of 29th December, 1825, made a report accompanied by a manual prepared under his direction in conformity with the resolution of 11th May, 1826, on the growth and

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(1) Under the tariff of 1824, in part repealed by this act, the total importations in four years amounted to $301,558,885, and the duties to $121,637,942, an average of forty and a quarter per centum.

(2) The passage of this act produced much dissatisfaction and threats of retaliation both in England and the Southern States. At public meetings, resolutions to abstain from the use of every thing produced in the tariff states, and even from communication with them, with various propositions of a retaliatory kind were passed in Baldwin county, Georgia, and Barnwell district, South Carolina, and much excitement was manifested elsewhere.

manufacture of silk, of which reports the Senate ordered six thousand copies to be printed.[1] The manual was a valuable digest of information upon the history and management of silk worms, and the manufacture of silk with plates of the most approved machinery. It contributed to the general interest at this time awakened on the subject of silk culture, and to the diffusion of correct knowledge in relation to it.

The Pennsylvania Society for the Promotion of the Culture of the Mulberry and the raising of silk worms, offered on 2d April the following premiums to promote the objects for which it was organized, viz.: sixty dollars for the greatest quantity of sewing silk of the best quality, produced within the state, from cocoons raised therein by one family, not less than twenty pounds, and smaller sums of forty and twenty-five dollars for the next greatest quantity not less than fifteen and ten pounds; premiums of fifty and thirty dollars for the greatest quantities of cocoons not less than one hundred and fifty pounds; fifty dollars for the largest lot of white mulberry trees, not less than four hundred, within twelve miles of the city, and sums of thirty and twenty dollars for smaller lots. The culture of the mulberry was this year commenced at Economy, in Pennsylvania, by Mr. George Rapp and his associates, whose experiments with the white Italian mulberry and the morus multicaulis, and in the manufacture of silk, were among the most successful in the country.

On the 11th June of this year, the Congress of Peru "considering that new states ought to encourage, above all, their own manufactures and industry," decreed that within ten months from Europe, and eight months from the states of America (Feb. 11, 1829), all articles then paying ninety per cent. duties should be totally prohibited. These articles embraced American bleached and unbleached cottons, hats, shoes, soap, tobacco, etc.; and the prohibition was also extended to flour, butter, rice, and some other articles. In consequence of a revolution in the following year, the decree was annulled by the new administration on June 15, 1829.

The largest wool sale in the United States up to this date, took place in Boston on 10th June, at the hall over the new market house, when Messrs. Coolidge, Poor, and Head, offered 1536 bales of Saxony, Spanish, and other foreign and American wool, amounting to four hundred thousand pounds, valued at from two to three hundred thousand dollars.

The manufacturing borough of Manayunk, Pennsylvania, contained at this time, ten mills in operation and in course of erection, including Richards' rolling and nail mills. The former employed 636 persons, and

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(1) Senate Document, No. 175, 20th Congress, 1st Session. Wm. A. Vernon, Esq. of Rhode Island, published this year a translation of the work of M. De Labrousse on the cultivation of Mulberry trees, with valuable notes by the translator.

embraced manufactures of flour, drugs, saw grinding and polishing, carding and filling of cloth, cotton and woolen goods, paper, etc., nearly all of which had grown up within six years.

Lexington, Kentucky, contained ten manufactories of cotton bagging and bale rope, in which five hundred persons were employed, of whom not over two per cent. were white. There were in other parts of the state as many more. The annual produce was nearly one million yards of cotton bagging and two million pounds of bale rope, beside large quantities of twine and yarns. There were also ten cotton manufactories. The Fayette factory, near the town, spun weekly, between four and five thousand dozens of cotton, and had recently put up looms to make about fifty pieces of muslin, thirty yards each, per week. Mr. James Weir's cotton factory worked up about two hundred and fifty bales of cotton annually. There were three woolen factories. The Lexington white lead factory made annually from eighty to one hundred thousand pounds of white and ten thousand pounds of red lead. The stock was about six thousand dollars, and the dividends about eight per cent. per annum. This city had numerous other establishments, as grist mills, breweries of beer and porter, paper mills, ropewalks, distilleries, foundries, nail works, etc. About two thousand tons of hemp were annually raised in the vicinity, and the culture had greatly increased of late.

The Covington Cotton Factory, at Covington, in the same state, opposite Cincinnati, was built this year, at a cost of sixty-six thousand dollars.

One or more cotton spinning mills were in operation at Vincennes, Indiana, owned by Messrs. Reynolds & Bonner, and H. D. Wheeler.

Notwithstanding the hostility of the South to the tariff act, several cotton manufactories were projected within a few months, and others were about to go into operation—one at Augusta, two at Milledgeville, and another at Indian Springs in Georgia. The Petersburg Virginian contained an essay in favor of their establishment at that place, and efforts were made to establish cotton and woolen factories at Fredericksburg in that state.

Two more of the large manufacturing companies of Lowell, Massachusetts, were this year incorporated, and commenced operations, viz.: the Appleton Company, and the Lowell Manufacturing Company. The Lowell Bank was also chartered.

A charter was granted in Connecticut to the "Norwich Water Power Company," with a capital of forty thousand dollars, for the construction of works to bring into use the immense and previously unoccupied water power of the Shetucket, below its junction with the Quinebaug, at

Norwich. A substantial stone dam, 280 feet in length, and a canal, were built, which furnished power for sixty thousand spindles. Within four or five years five large factories were erected, the largest, that of the Thames Company for the manufacture of cotton cloths, being one of the finest in New England.

Colonel Breethaupt, agent of a manufacturing company in South Carolina, visited the New England factories in October, and in proof of the superior character of the machinery made there, stated that the agent of an extensive cotton factory, about to be established in Prussia, after visiting England, gave the preference to American machinery, and ordered at one factory $100,000 worth. The shops, he said, were filled with orders.[1]

Considerable excitement existed at this time in South Carolina, growing out of the improvement in the texture of Sea Island cotton. Kinsay Burden, sen., of St. John's Colleton, in 1804 or 1805, had produced a "packet" of cotton, worth in the English market twenty-five cents a pound more than any other kind. He had since assiduously employed his botanical knowledge, in effecting further improvements in the staple, the method remaining undiscovered by others. In 1826 he sold his first full crop of sixty bags for one hundred and ten cents per pound. In the following March, Mr. Whitemarsh B. Seabrook read, before the Agricultural Society of St. John's Colleton, of which he was secretary, a "report, accompanied by sundry letters, on the causes which contribute to the production of fine Sea Island cotton," which directed attention still more to the subject and especially to the selection of proper seed. The experiments were successful and resulted in the rejection of the clean seed, and the use of the downy retained for planting. During this year, Hugh Wilson, sen., of the same parish, obtained ninety cents for ten bags, and from his two succeeding crops one dollar and one dollar and twenty-five cents per pound. Two bags of extra fine, raised by him this year, sold for two dollars per pound, the highest price ever obtained in any country for cotton. So valuable was Mr. Burden's secret deemed, that he offered to sell to the Legislature for $200,000 all his seed, and to communicate the method of perpetuating the silky properties of the new cotton fibre, for which knowledge, it is said, Mr. William Seabrook of Edisto, proposed at one time to give $50,000, although both offers were subsequently withdrawn. This revolution in the cotton culture is believed, however, to have been injurious to the planters generally. The staple has been continually improving in quality, at the expense of its quantity, and in consequence of the fall in prices, has resulted in loss, except to a few individuals.[2]

(1) Niles's Register. (2) The Cotton Plant.

At the exhibition of the Franklin Institute, held in Philadelphia, October 8th to 16th, a premium was awarded to Seth Boyden of Newark, New Jersey, for an assortment of buckles, bits, and other castings, of annealed cast iron, remarkable for smoothness and malleability. It was the first attempt in this country, known to the committee, to anneal cast iron for general purposes. Premiums were also awarded for japanned waiters and trays, to J. V. Blackmar of Philadelphia, and to the Merrimac Manufacturing Company of Massachusetts, for the best specimens of calicoes or prints for ladies' dresses. Prints were exhibited also by the Taunton Company, deemed nearly equal to them, and others by the Warren Factory of Baltimore.

Among the premiums were also the following: to S. P. Wetherill & Co., Philadelphia, for samples of one thousand pigs of lead, the product of the Perkiomen mines, smelted by them; to Wm. and T. H. Day, for safety door locks of their invention; for flannel, from the Yantic factory, Connecticut, for hearth rugs, the first product of machinery invented by Lloyd Mifflin; to Messrs. Terhoeven, for pins made by them. Pianos were exhibited from eight different manufacturers, and honorary mention was awarded to Mr. Rowland of Philadelphia, for superior mill, pit, and cross-cut saws; to George W. Carpenter, for pharmaceutical preparations; to the Maryland Chemical Company, for bleaching salts, preferred by many to the celebrated Tennants of Glasgow, for magnesia, etc.;[1] to Jones, Keim & Co., of Windsor Furnace, near Harrisburg, Pennsylvania, for the most perfect specimens of castings known of this country's production, rivaling the most splendid Berlin medals; and to George C. Osborne of Philadelphia, for water colors, and to other exhibitors.

The first manufacture of Varnish, except for individual use, is said to have been this year commenced in New York, by P. B. Smith, 202 Bowery, who the next year was joined by a Mr. Hulburt, and in the following year, Tilden & Hulburt started the second factory. Mr. Smith, subsequently (1836), commenced the business with D. Price, at Newark, New Jersey, where seven or eight establishments now manufacture the well known *Newark varnishes*—Mr. Smith's being one of the oldest and largest in the United States.[2] Copal varnish had been made

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(1)The London Mechanics' Magazine for this year, stated that the United States was now wholly supplied with Epsom Salts, which it formerly received from England, by the "factory established in Baltimore, making a *purer* salt than in Europe and at *much less price*." It was made by Messrs. McKim, Sims & Co., who produced the next year over 1,500,000 pounds. Sulphate of Quinine was worth this year seven or eight dollars an ounce, but its manufacture was soon after commenced, and in 1831 it sold in Baltimore for $1.40 per ounce.

(2) Coach-makers' Magazine, vol. 1, p. 212.

on a small scale in Philadelphia, before this time, by Mr. Christian Schrack, who, in 1830, devoted his whole attention to its manufacture.

Castor oil was manufactured in considerable quantities from the palma christi or castor bean, in Illinois and some other parts of the West. Mr. Adams of Edwardsville, Illinois, in 1825, made five hundred gallons, which sold at $2.50 per gallon; in 1826, eight hundred gallons; in 1827, one thousand gallons, which brought $1.75; and this year, eighteen hundred gallons, at one dollar per gallon. Two years after, he started two presses and made over ten thousand gallons, which sold for seventy-five to eighty-seven cents per gallon.

The Lead regions of that state were at this time filled with miners, speculators, and others, attracted thither during the last few years for mining purposes. The lead manufactured this year amounted to 11,105,810 pounds.

The sugar plantations of Louisiana, as ascertained by personal visitation to each estate, yielded this year 87,965 hogsheads of sugar, and 39,874 of molasses. There were besides, two hundred and six planters, who produced nothing this year, but would the next. The largest plantation was that of General Wade Hampton, seventy miles above New Orleans, which yielded 1640 hogsheads of sugar and 750 of molasses. The sugar estates in operation numbered 308; their manual power was twenty-one thousand slaves; the steam power, eighty-two engines; horse power, 226; capital invested, about $34,000,000. Since 1816, when the state produced fifteen thousand hogsheads of sugar, the business has greatly increased under the protecting duty then laid, and now supplies nearly two thirds of the domestic consumption. Upward of thirty-nine thousand hogsheads of sugar, and about eighteen thousand five hundred hogsheads of molasses, were sent from Louisiana to northern parts of the Union, and nearly as much up the river in the year ending September 30. Its price at Louisville, Kentucky, was seven and a quarter cents by the barrel.

The iron manufacture of Pennsylvania amounted to 22,600 tons of bar and rolled iron, and 14,000 tons of castings, equal to 48,000 tons of pig metal. The Champlain region of New York produced about 3,000 tons of bar iron, and the state an amount equal to 13,500 tons of pig iron; Virginia, 10,500; Ohio, 5,000; Kentucky, 4,500; Tennessee, 5,000; New Jersey, 4,000; Maryland, 3,000; North Carolina, 1,800; the six New England states, 1,200; and the rest of the states about 4,500 tons; total, 101,000 tons. The whole number of furnaces in operation has been elsewhere estimated on reliable data at 192, and the product in pig iron and castings at 123,404 tons. The price of American hammered bar iron, which had advanced within three or four years, was in the seaports $105 per ton, and on the Ohio, $115 to $125.[1]

The first locomotive trip upon a railroad in America, is said to have been made during this year upon the Carbondale and Honesdale railroad, extending from the western terminus of the Lackawaxen canal to the Lackawanna river, and connecting the canals of the Delaware and Hudson Canal Company with their coal mines in Luzerne county, Pennsylvania, whence the first coal was sent the next year. The engine was imported from England, where the use of locomotives was by no means established, and even appears to have been in some instances abandoned in favor of stationary engines for railways.[1] The engineer was Mr. Horatio Allen, of New York, since engineer of the New York and Erie railroad, who made the experimental trip alone, crossing the Lackawaxen, on trestle work thirty feet high, with a curve of 355 to 400 feet radius, and returning in safety, contrary to the expectations of many spectators. The engine proved afterward to be too heavy for the road. The first American patent for a locomotive engine, was taken out this year, by W. Howard, of Baltimore.

The Daily Advertiser, and several other newspapers in Boston, were at this time printed on Treadwell's Power Presses, which were moved by steam, and threw off about six hundred impressions per hour. The newspapers of that city numbered thirty-four, including seven dailies, and a weekly paper called the "American Manufacturer." The number of printing offices in the United States at this time, was not less than nine hundred, an increase of 525 since 1810. The newspapers of the whole Union were estimated to consume 104,400 reams of paper yearly, worth $500,000, and those of New York, 15,000 reams, worth four to five dollars per ream.

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(1) Evidence before a committee of Congress.

(2) Early in this year, a deputation of the Liverpool and Manchester Railway Company, whose double track road, the first great experimental work of the kind in England, was approaching completion, reported in favor of *stationary engines*, as a tractive power. But the directors, encouraged by their engineer, Mr. George Stephenson, whose opinion that a locomotive could be constructed to travel fifteen or twenty miles an hour was ridiculed before a committee of Parliament, and by others, decided to make a trial of locomotives, and offered a premium of £500, for the best locomotive engine, to draw on a level three times its own weight (which was not to exceed six tons), at the rate of ten miles an hour, and to cost not over £550. At the trial on the 8th October, four engines competed for the prize, which was given to Stephenson's "Rocket," which traversed the prescribed route, at a speed varying from twelve to twenty-nine miles an hour, establishing the epoch of land locomotion by steam, and procuring for Mr. Stephenson the title of the "father of the locomotive system." The first Stephenson engine imported into the United States, was the "Robert Fulton," for the Mohawk and Hudson Railroad in 1831, about which time their construction commenced in this country.

Several additions were about this time made in the manufacture of Paper. William Morgan, of Meadville, Pennsylvania, commenced at that place on a small scale, the first manufacture of paper from straw and hay, for which he obtained a patent. The paper was of a yellow color, but strong and smooth, and an edition of the New Testament is said to have been printed upon it, which cost only five cents a copy. On the 28th November, a canal boat was launched at Meadville, built of materials growing upon the banks of French creek the day before, which left for Pittsburg on the 30th, with twenty passengers and three hundred reams of straw paper.[1] Machinery was also erected this year, or the next, at Chambersburg, Pennsylvania, for the manufacture of paper, from straw and blue grass, to the amount of three hundred reams daily. In September of the next year, it was made at Baltimore by hand process. A patent was taken out by E. H. Collier of Plymouth, Massachusetts, for making paper from sea grass (*ulva marina*), and by several others for mechanical processes and machines connected with paper making.[2]

An improvement in the vibrating apparatus of the Fourdrinier or endless wire-web paper machine, was this year patented in England by Mr. George Dickinson, and came into extensive use.

The amount of fees received for patents, etc., by the Patent Office, from its organization to December 31, was $160,659.37. Among the patents issued this year were the following:

William H. Folger, Spartansburg, S. C., Feb. 13, for separating gold and silver from earth, for which he received two other patents the next year; William Magaw, Meadville, Pa., March 8, making paper, and to the same, May 22, for making paper from hay and straw; Elisha H. Collier, Plymouth, Mass., April 15, paper from sea grass; Wm. Hoyt, Vernon, Ind., April 29, corn sheller, reissued June 13, 1831; Richard Waterman & George W. Annis, Providence, R. I., Aug. 30, making double paper on machines, by which any number of thicknesses might be made by pressure between rollers, etc.; Mason Hunting, Watertown, Mass., Oct. 20, improved top press roller, for making paper (of any thickness at one operation);[3] Marsdan Haddock, New York, July 17, making paper by the flat press in sheets (by the dipping process); Richard Mitchell and N. Butterworth, Troy, Mass., March 22, satinett power loom; Cyrus Durand, New York, May 22, copper plate printing press; Charles G. Williams, New York, March 29, cylindrical printing press; E. Burt, O.

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(1) Day's Historical Collection of Pennsylvania, pp. 256, 258.

(2) See Patents.

(3) John Dickinson of Nash Mills took out a patent in 1830, in England, for making paper of any thickness by uniting the surfaces of two or more sheets.

D. Boyd, & A. H. Boyd, Manchester, Ct., Aug. 19, power loom for weaving check and plaid; this loom, invented by Rev. E. Burt, was the first American check loom; William M. Johnson, New York, Aug. 21, and George F. Peterson, New York, Oct. 13, casting printers' types. The machine of Mr. Johnson, secured a much sharper outline and better face to the letter by the use of a pump to force the liquid into the matrix, and has been much improved since. Samuel S. Williams, Roxbury, Mass., Aug. 22, making mats from manilla and other grasses; Charles Danforth, Ramapo, N. Y., Sept. 2, bobbin and flyer; Thomas W. Dyott, Philadelphia, Oct. 10, melting and fusing glass by the use of rosin; Allen Ward, Philadelphia, Oct. 11, triangular measure case ruler for garments—these instruments are still in use we believe; Isaac Sanford, Blockley, Philadelphia, Oct. 11, carding, winding, and making of hats—the model of this machine was deposited in the office, and the money paid in February, 1799, since which, the invention had lain dormant; Joshua Shaw, Philadelphia, Oct. 24, percussion lock for cannon; H. F. West and A. F. Stevens, Richland, N. Y., Oct. 29, mode of forming hat bodies; William Coburn, Gardner, Maine, Nov. 1, extracting tannin by steam; B. B. Howell, Philadelphia, Nov. 6, making malleable iron; Lemuel W. Wright, London, England, Dec. 6, arranging machinery for manufacturing wood screws. [This apparatus, by the patentee of the pin machine, was also patented in England in March, 1827, and an amended patent was given in September of this year. It was somewhat complex.] William Howard, Baltimore, Dec. 10, locomotive steam engine (the first recorded in this country); William Woodworth, Hudson, N. Y., Dec. 27, planing, tongueing, grooving, and cutting boards, etc., and dressing brick, or other mineral or metallic substances. This patent is remarkable for the amount of litigation arising out of it for many years after, and for having been longer extended than any other patent, as well as for the great profits it has yielded to its owners.

The relations of the General Government to the subject of protecting duties, upon which the public mind continued to be exercised to a degree that threatened the harmony of the Union, was brought to the notice of Congress by the last annual message of President Adams. Having observed that the imports and exports, under whatever tariff, had always nearly corresponded in amount, and were both likely to be much increased by the recent removal of the interdict against American breadstuffs abroad: that the great interests of agriculture, manufactures, and commerce, were inseparably united, and were alike under the protecting power of the Legislature, and that taxes for revenue 1829 should be adjusted as equally as possible, but that countervailing regulations, such as the legislation of England, in excluding nearly all our great staples, except cotton, which she needed in times of scarcity, must often bear heavily on some, the message proceeds:

"Is the self-protecting energy of this nation so helpless that there exists no power to counteract the bias of this foreign legislation? That the growers of grain must submit to this exclusion from the foreign markets of their produce; and the shippers must dismantle their ships; the trade of the north stagnate at the wharves, and the manufacturers starve at their looms, while the whole people shall pay tribute to foreign industry to be clad in a foreign garb? That Congress is impotent to restore the balance in favor of native industry, destroyed by the statutes of another realm? More just and more generous sentiments will, I trust, prevail.

"If the tariff adopted at the last session of Congress shall be found by experience to bear oppressively upon the interests of any one section of the Union, it ought to be, and I cannot doubt will be, so modified as to alleviate its burdens. To the voice of just complaint from any portion of their constituents, the representatives of the states and the people, will never turn away their ears. But so long as the duty of the foreign shall operate only as a bounty upon the domestic article—while the planter, and the merchant, and the shepherd, and the husbandman, shall be found thriving in their occupations under the duties imposed for the protection of domestic manufactures, they will not repine at the prosperity shared with themselves by their fellow citizens of other professions, nor denounce as violations of the Constitution the deliberate acts of Congress, to shield from the wrongs of foreign laws the native industry of the Union."

The strong dissatisfaction of the people of the Southern States, and of some other portions of the Union with the tariff act of the last session, was manifested by various measures of a public character, and soon after the reassembling of Congress, several earnest remonstrances were presented to the Senate on the subject from legislative and other bodies. At the suggestion of Governor Forsyth, who, in his message of Nov. 4, advised the people of the state to substitute as far as possible, their own household manufactures for those of Europe and the Northern and Eastern States, the Legislature of Georgia, on the 10th December, adopted a solemn protest against the recent act, and demanded its repeal, as fraudulent, oppressive, partial, unjust, and a perversion of the powers of Congress, which was presented to the Senate on the 12th January, for the purpose of being preserved among the archives of that body. On the 12th February, the Legislature of South Carolina pro sented, through Messrs. Smith and Hayne, the protest against the act as unconstitutional, oppressive, and unjust, but declaring their anxious "desire to live in peace with their brethren, to do all that in them lies to preserve and perpetuate the Union of the States and the liberties of which it is the surest pledge."

A committee of the Assembly of Virginia, acting upon the resolutions of Georgia and South Carolina, also reported, on 21st February, a series of resolutions, which were adopted, condemnatory of the tariff as a violation of constitutional authority; and, on the 28th, a protest of the Alabama Legislature, to the same effect, was read in the Senate of the United States. North Carolina also entered her protest. The remonstrances from Georgia and Alabama, claimed the right of resistance to acts which transcended the legislative powers of Congress, and trespassed upon the reserved rights of the States.[1] A meeting of merchants and others of Boston, opposed to the tariff, also adopted, on 13th Jan-

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(1) Much language of an inflammatory nature was about this time used in public meetings and by the press. The Milledgeville Journal said, "The memorable scenes of our Revolution have again to be acted over." A meeting in St. John's Parish, S. C., declared, "We have sworn that Congress shall at our demand repeal the tariff. If she does not, our State Legislature will dissolve our connection with the Union, and we will take our stand among the nations, and it behooves every true Carolinian to stand by his arms, and to keep the halls of our Legislature pure from foreign intruders." That the tariff acts "ought not to be submitted to," and that "the adhesion of the State of South Carolina to the Union, shall depend upon the unconditional repeal of the tariff laws of 1816, 1824, and 1828, so far as they are inconsistent with the constitutional rights of our citizens." "This is not the language of vain-glorious boasting, of hot-headed enthusiasm," it was said on an another occasion. "It is the resolute voice of despair. It is useless to disguise matters, or to shut our eyes upon the possible (must we say probable?) consequences. If this spirit spreads over the South—and what can prevent it?—civil war must follow, and the bonds of the Union are broken."

Mr. George Canning, while prime minister, is said also to have declared that "he would make the people of America reduce their tariff or dissolve their Union." This led to a correspondence with the leading opponents of the act in this country, and laid the foundation of nullification in South Carolina, which resulted in the compromise tariff of 1833.

In consequence of the excitement on the subject, M. Carey, toward the close of the last year, published a series of "common sense doctrines" to the Southern people, and endeavored by means of a lengthy circular, to organize a "society of Political Economists" for the diffusion of what he considered sounder views of the principles of protection, in the hope of allaying the ferment. Failing to meet with support, he finally abandoned the active advocacy of the cause about this time, and devoted his energies to various benevolent and charitable objects, in which he was always prominent.

With the commencement of this year, Mr. Condy Raguet issued the "Free Trade Advocate," a monthly journal devoted to the support of Free Trade principles, adopting as his motto the answer of the French minister Colbert "*Laissez nous faire,*" "let us alone," which was the favorite maxim of the anti-tariff party. The Advocate, after the appearance of two volumes, was merged in the "Banner of the Constitution," a semi-weekly paper under the same editorial management.

uary, resolutions declaring the acts partial, oppressive, and contrary to the spirit of the Constitution, and a memorial to Congress on the subject.

An act was passed, January 21st, allowing an additional drawback of five cents a pound on sugar refined in the United States when exported therefrom.

Acts of the 3d March authorized the President of the United States to cause the reserved salt springs in the State of Missouri, and the reserved lead mines in the same state to be exposed to public sale, as other lands. The lead mines had been worked for many years imperfectly, with but little public benefit, but the act did not apply to the mines of the upper Mississippi, which had been worked since 1720.

A report made to the New York Legislature, February 19, recommending a bounty on domestic salt, stated that the supply of brine at the Salina springs was inexhaustible, and the strongest in the United States, making fifty-six pounds of salt to every forty-five gallons. Salt was made at Salina at a fair profit of twelve and a half cents per bushel of fifty-six pounds. The state duty was twelve and a half cents, freight and toll to Albany nine cents, and transportation thence to New York four cents, which, with two cents allowed for waste, made it cost in New York forty cents a bushel. St. Ubes salt was about thirty-five cents per bushel.

The capital employed in the manufacture of salt in the United States was estimated to be $6,964,988, and the product 4,444,929 bushels. The quantity imported during the fiscal year was 5,945,547. England, the British West Indies, and Portugal, were the principal sources of supply. Key West, in Florida, the most southern settlement in the Union, became about this time a new source of domestic supply, the ponds yielding this year about four thousand bushels.

A decree of the Liberator President of the Republic of Columbia, at Quito, dated May 8, imposed for purposes of revenue a tariff of duties on imports, which was almost prohibitory of many articles of export from the United States.

A decree of the Mexican government, dated May 22, prohibited, under the penalty of confiscation, the importation into that republic of a large list of raw and manufactured articles, including many of the leading products of American manufacture.

At a meeting of the cotton manufacturers of Philadelphia, on 3d February, resolutions were adopted to establish one or more private houses for the sale of their goods, and to discontinue sales at public auction, as having a tendency to reduce the prices below value, and injurious to the interests of manufacturer, workman, dealer, and consumer.

The Boston Daily Advertiser, of the 2d March, gave the names of twelve cotton factories destroyed by fire within one hundred and fifty miles of that city, since the first of January, involving a total loss in six of them of $215,500, and the insurance amounting to $42,500. The burning of the Byram and Phillipsburg factories, in Pennsylvania, about this time, increased the loss to $321,600.

An unusual degree of distress prevailed at this time among the manufacturers of New England, particularly in the cotton branch, producing numerous failures and great depreciation of the value of stocks. The cause was by some ascribed to the disappearance of specie, and by others to over-speculation, which had tempted great numbers into manufacturing, with insufficient capitals, and a consequent over-production.

The number of incorporated manufactories in Massachusetts at this date was stated at two hundred and thirty-five. A large proportion of them manufactured cotton, wool, and iron; but there were also incorporated companies for the manufacture of glass, hair, leather, wire, files, lead, duck, pins, soapstone, cordage, salt, calico, brass, copper, lace, umbrellas, linen, hose, ale, beer, type, cotton, cards, gins, glass bottles, lead pipe, etc.

The State of Rhode Island contained one hundred and thirty-nine cotton factories. The towns of Warwick and Smithfield had each twenty woolen and twenty cotton factories. The use of Turkey red in calico printing, which had long given the French an advantage over English and American prints, was this year successfully introduced by the manufacturers of Lowell. A fire department was also established in that town, and the Lowell Institution for savings was incorporated.

About twelve thousand pieces of calico were this year made at the new print works of Mr. Marshall, near Hudson, New York. A new establishment also went into operation at Baltimore, for weaving stuffs for calicoes, having one hundred power looms driven by steam, making fifteen thousand yards weekly.

On the 26th March, the corner stone of a factory was laid at Athens, Georgia, which was about the commencement of manufactures in that state since the war. The building was burned soon after, but was rebuilt.

About five hundred bales of cotton were this year grown in Texas.

The town of Lynn, in Massachusetts, had a population of over five thousand, chiefly supported by its shoe manufactures, the product of which was estimated at 1,200,000 to 1,400,000 pairs of shoes annually, at an average value of seventy-five cents each, or $1,000,000. The females of the town earned more than $60,000 annually by binding and ornamenting. Large quantities of low-priced fancy shoes were exported to South America, and sold at a profit. About sixty tons of chocolate were annually made by a factory at Lynn.

The paper mills in Massachusetts, in November, numbered sixty, in six of which machinery was used. They consumed seventeen hundred tons of rags, junk, etc., and made paper to the value of $700,000 per annum. The entire paper manufacture of the United States was estimated to amount to the yearly value of over $6,000,000, and to employ upward of ten thousand persons. Large quantities of rags were imported from Germany and Italy. Several improvements were patented in the manufacture of straw and other paper, including an improvement in the cylinder machine, by Isaac Sanderson, of Milton, Massachusetts, by which greater equality of strength in machine-made paper was secured. Straw paper began to be somewhat extensively used for wrapping in Philadelphia. It was also used in printing Niles's Weekly Register, which had an extensive circulation; being regarded as the best and cheapest paper then made for that purpose. It was principally made at Chambersburg, by machinery, and cost less than two dollars per ream, imperial size.

The town of Paterson, New Jersey, contained 7,033 inhabitants, and had four machine shops, one of which, Goodwin, Rogers & Company, made, in the last year, 15,048 spindles with all the necessary accompaniments, worth, at twelve dollars each, $180,576, in addition to 1,020,000 pounds of iron, and 35,000 pounds of brass castings, made in a foundry connected with it. A rolling and slitting mill and nail factory made 672,000 pounds of nails. There were seventeen cotton factories, with 32,000 spindles, of which fourteen factories and 27,679 spindles were in operation, and worked up 2,179,600 pounds of cotton into 1,214,450 pounds of yarn, 150,000 yards of cotton duck, and 1,861,450 yards of other cotton cloth annually. In the town were four hundred and eighty-seven hand and power looms, and 33,965 cotton and flax spindles.

Pittsburg, Pennsylvania, contained eight rolling mills, employing three hundred hands, and using six thousand tons of blooms, chiefly Juniata, and fifteen hundred tons of pig iron. A nail factory employed one hundred and fifty hands, and made eighteen tons of nails. There were seven steam engine factories, with two hundred and ten hands, which had made several engines for the northern lakes, a few to go east of the mountains, and one to Mexico. Within two or three years the casting of sugar kettles, sugar mills, and small steam engines for the planters of Louisiana, had become an important branch of industry. The plow factory was established this year by Samuel Hall. In October, the mechanics and artizans of the town bore public testimony to the excellence of the files made by Broadmeadow & Co., who had recently established a large manufacture of files and rasps, from steel of their own make, and of finished workmanship. Some penknives were also made there.

The manufacture of penknives and pocket knives, articles almost exclusively imported up to this time, was commenced somewhat extensively at Worcester, Massachusetts, by Moses L. Morse & Co., the former of whom had invented a pin machine several years before, and superintended the business. The several parts of the knife were made by machinery, and each by appropriate sets of workmen, with such success as to be with difficulty distinguished from English cutlery. Two other cutlery establishments were commenced in the vicinity within two years after. Superior table knives and forks were made at Philadelphia.

The Lemnos factory for the manufacture of edge tools in almost every variety was about this time established in the borough of Chambersburg, Pennsylvania, by Messrs. James Dunlop and George A. Madeira, by whom an axe and hatchet, of superior quality, were presented to President Jackson, in April of the next year. The hardware and cutlery manufacture received a considerable extension about this time.

The aggregate value of goods sold at the sixth semi-annual sale of the New England Society at Boston, in March of this year, was estimated at $1,300,000.

On the 2d May, the "American Institute, of the city of New York, for the purpose of encouraging and promoting domestic industry in this state and the United States, in agriculture, commerce, manufactures, and the arts," was incorporated by the Legislature. With purposes similar to those of the "Conservatory of Arts and Trades" in Paris, and the "National Repository" in London, it aimed to promote its objects by an annual exhibition of machinery, manufactures, etc., by awarding premiums, by the formation of a repository of models, and a library of books relating to agriculture and the arts, and was empowered to hold property yielding an income of thirty thousand dollars per annum. The first annual fair of the Institute was held at Castle Garden, in November, when premiums were awarded for the following articles of domestic manufacture. For broadcloths, cassimeres, etc., twelve premiums; manufactures of cotton nine, of iron six, of glass four, hats three, pianos four, paper seven, books and printing four, stoneware six, hemp and flax three, leather four, ladies' apparel six, machinery three, miscellaneous articles thirty-seven. The Phœnix mill of Mr. Colt, of Paterson, New Jersey, received the premium for the best article of cotton bagging, which was made of Sea Island cotton, and excited much curiosity. The exhibition of manufactures at the Franklin Institute this year exceeded any previous one. Samples of osnaburgs bagging and negro cloth were exhibited by the South Carolina Manufacturing Company of Darlington, the last of which could be retailed at twelve and a half cents per yard.

A large cloth manufactory, and a carpet factory, was at this time in operation at Martinsburg, Virginia, both of which produced fabrics of beautiful pattern and excellent quality. Felt carpeting was made this year at Catskill, New York, and was considered durable and cheap. A flannel factory was established at Barnet, Vermont, by water power, capable of finishing three thousand yards weekly, from which the first bales were on a team to Boston on 13th October. It belonged to Mr. Henry Stevens.

The manufacture of damask table linen was commenced at Philadelphia in December, by Hamilton Stewart, who made some very elegant patterns.

It was estimated that twenty-five hundred Piano Fortes, of the aggregate value of $750,000, were made this year in the United States, of which nine hundred were made in Philadelphia, eight hundred in New York, seven hundred and seventeen in Boston, and a considerable number in Baltimore.

Handsome silk ribbons, in great variety, were manufactured in Baltimore, from American silk. Silk to the value of twenty-five thousand dollars was made at Mansfield, Connecticut, chiefly by women and children. The first attempt in the United States to manufacture sewing silk by machinery was made at Mansfield this year, by Captain Joseph Conant, afterward of the firm of Conant & Smith, Northampton, Massachusetts, and Mr. Atwood, subsequently of the firm of Atwood & Crane, Mansfield, by whom the business was continued. After many losses and discouragements, they succeeded in making a good article. Silk pocket handkerchiefs by Mr. Bryant, and other silk goods by James Reed, were exhibited at the American Institute fair. A powerful interest in the silk culture was excited by some essays and experiments on American silk, published in July of this year, at the suggestion of John Vaughan, Esq., by Mr. D'Homergue, a practical silk manufacturer, of Marseilles, who had been invited to the United States by the American Silk Society in Philadelphia. He advocated, in conjunction with P. S. Duponceau, Esq., a filature system as the only effective means of promoting the silk culture, and their efforts were followed by the introduction, soon after, in Congress, of the famous silk bill, which was ultimately defeated, an experimental filature having, in the mean time, been started in Philadelphia by them, in 1830.

There were at this date two watch crystal manufactories in the United States, one at Boston and one at Pittsburg, Pennsylvania. Watch glasses were also made to some extent in the glass factories at Jersey City, New Jersey.

Tin was this year discovered by Professor Hitchcock, of Amherst, Massachusetts, at Goshen, in Connecticut, being the first discovery of tin in the United States. It consisted of a single crystal of oxide of tin (cassiterite, or tin stone), weighing fifty grains, contained in granite. It has been since found in small quantities in different places by Professors Sheppard, Rogers, and others.

Specimens of gold, weighing ten pounds, four pounds, and others of less weight, were discovered in Anson county, North Carolina. The first gold received at the mint from Virginia, was deposited this year to the value of $2,500; and the first from South Carolina, to the value of $3,500. The first from Georgia was sent the next year to the amount of $212,000. A map of the gold region of North Carolina, published by Professor Mitchell, indicated nine different mining localities in that state, three in the "primary," and six in the "transitive, or slate" rocks.

A furnace was erected at Strafford, Vermont, for smelting copper pyrites, which occur there with sulphuret of iron, being employed there in the manufacture of copperas, which was made at this time to the amount of ten thousand tons annually, the works having been extended in the last year.

The manufacture of bricks by machinery was successfully commenced in New York. The machines made twenty-five thousand bricks per diem of twelve hours, ready for the fire as soon as they left the machine. They sold readily at five dollars to eight dollars per thousand. The Salamander Fire-brick Works, at Albany, was established at this date by Jacob Henry; and Mr. Berry and others of Baltimore, were so successful about this time in the manufacture of fire bricks as to stop the importation.

At the Springfield Armory, in Massachusetts, the arms, etc., manufactured since 1795 to December 31st, amounted to 296,982 muskets, 250 rifles, 1,000 pistols, 1,202 carbines, 12,840 ball screws, 93,631 wipers, 139,700 screw-drivers, 12,720 sprig vices, 1,936 sets of verifying instruments for muskets, 2,890 arm chests, and 46,545 muskets repaired. The expenditure, including pay of officers and workmen, had been $3,700,559.76. The cost of each musket, exclusive of repairs, improvements, machinery, etc., for 1829, would be about $10.66, a reduction of $1.68 since 1815.

The number of steamboats built on the western rivers since 1811 was three hundred and twenty-one, of which one hundred and eighty-eight were still running.

PATENTS.—William Delit, East Hartford, Conn., Jan. 13, machine for cleaning rags for paper; John C. Ely, New York, Jan. 28, screw dock; John Goulding, Dedham, Mass., two patents, dated Feb. 16, and two others June 11 and July 21, for manufacturing wool; G. H. Burgin, Philadelphia, April 3, use of ley from soap as a flux for glass; S. Beckwith, S. Beckwith jr., and E. Beckwith, Jan. 27, machine for making shoe pegs; Joseph Soxten, Philadelphia, April 11, improvement in ever-pointed pencil cases, and William Jackson, Philadelphia, July 27, a slide instead of a screw in ever-pointed pencil cases; S. G. Reynolds, Bristol, R. I., April 13, machine for making nails and rivets. This was for making wrought iron nails, etc., by machieery, almost as cheaply as cast iron nails. Isaac Sanderson, Milton, Mass., April 18, cylindrical machine for paper making; Amasa Stone, Providence, R. I., April 30, improved power loom; John W. Cooper, Washington, Pa., Feb. 7, whitening straw and rags for paper making; R. Fairchild, Trumbull, Conn., May 4, agitator in paper making; Nathan Leonard, Merrimac, N. H., June 11, machine for pegging boots and shoes; Frederick B. Merrill, Buffalo, N. Y., June 13, chandelier of crystallized salt; John Arnold, Norwalk, Conn., July 15, forming the web of cloth without spinning or weaving; Reuben Wood, Erin, N. Y., Aug. 25, dyeing by steam; R. S. Tilden, Lynchburg, Va., Sept. 10, covering roofs with tin; Henry Korn, Philadelphia, Sept. 12, fly nets for horses, two patents reissued in 1834 and 1836; J. Rynex, J. Haskins, and S. Knower, Boston, Sept. 23, perpetual polished water proof boots and shoes; Daniel Baldwin, Ithaca, N. Y., scalding and napping hats; Anthony Doolittle, Ann Arbor, Michigan Territory, Nov. 10, distilling maize; David H. Mason and M. W. Baldwin, Philadelphia, Dec. 2, Bramah's hydrostatic press; William H. Bell, Fortress Monroe, Va., Dec. 8, elevating cannon. This patent was purchased by the United States government in 1836. John Thorp, Providence, R. I., Dec. 22, weaving narrow stuffs, such as ribbons, webbing, tapes, ferrets, girthings, chaise lace, fringes, etc., without the use of shuttles.

The number of patents in force in England at this date was 1,855, of which 152 were granted in 1828. Patents had to be taken out separately for England, Scotland, and Ireland, and the aggregate cost was $1,656, while in the United States it was only thirty dollars.

CHAPTER V.

ANNALS OF MANUFACTURES.

1830—1840.

THE attention of Congress was once more called to the subject of the Tariff, which continued to be violently discussed by the opponents of the late act. President Jackson, in his first annual message to the 1830 twenty-first Congress, at its first session, December 8th, 1829, made the following remarks:

"To regulate its conduct so as to promote equally the prosperity of these three cardinal interests (agriculture, commerce, and manufactures), is one of the most difficult tasks of government; and it may be regretted that the contemplated restrictions which now embarrass the intercourse of nations, could not by common consent be abolished and commerce allowed to flow in those channels to which individual enterprise, always its surest guide, might direct it. But we must ever expect selfish legislation in other nations, and are therefore compelled to adapt our own to their regulations, in the manner best calculated to avoid serious injury, and to harmonize the conflicting interests of our agriculture, our commerce, and our manufactures. Under these impressions I invite your attention to the existing tariff, believing that some of its provisions require modification. The general rule to be applied in graduating the duties upon the articles of foreign growth or manufacture, is that which will place our own in fair competition with those of other countries; and the inducements to advance even a step beyond this point, are controlling in regard to those articles which are of primary necessity in time of war."

The committee to which this part of the message was referred, reported against the expediency of any alteration of the tariff, but Mr. Cambreleng, from the Committee of Commerce and Navigation, on the 8th February, made a lengthy report, which was printed, recommending a modification of the existing tariff and revenue laws as incongruous and absurd in their provisions. On the 30th April, he introduced a bill to amend the navigation laws so as to secure a reciprocity of trade, at a uniform duty of thirty per cent. upon imports from such nations as would admit American products on like terms. The bill did not prevail, and another introduced in the Senate, by Mr. Benton, on the 23d of the same month, was also laid on the table on motion of Mr. Webster, and never taken up. The latter was entitled "A bill for the abolition of unnecessary duties, to relieve the people from sixteen millions of taxes, and to improve the condition of the Agriculture, Manufactures, and Commerce, of the United States," and provided for the repeal or the reduction of the existing duties on the principal imports, in favor of such nations as would reciprocate by treaty, and laid a duty of thirty-three and one third per cent. on furs and raw hides imported.

A bill introduced early in the session, by Mr. Mallory, from the Committee on Manufactures, in alteration of the several acts laying duties on imports, providing for the more effectual collection of the duties, and to prevent evasions of the revenue, became the subject of earnest discussion, upon the presentation of a new bill by way of amendment, by Mr. McDuffie of South Carolina. The substitute, which was rejected, proposed to repeal the acts of 1824 and 1828, so far as they imposed increased duties on woolens, iron, hemp, flax, cotton bagging, molasses, indigo, and manufactures of cotton—and to reduce the duty on salt to ten cents a bushel. Mr. McDuffie entered into a protracted discussion of the whole policy of protecting duties, designed to show their pernicious effects upon the various interests of the country, and particularly upon the South, which he represented to be suffering extremely from that cause. He repudiated with much severity of language, a constitutional right in the majority to govern, and was supported by Mr. Blair of the same state, who, also spoke in strong language, and declared that the time was at hand, when the rights and interests of his state, in common with those of the South, must be respected, or she would seek a remedy herself. The bill, after receiving several amendments, and the support of Messrs. Crawford of Pennsylvania, Everett of Massachusetts, Burgess of Rhode Island, and others, who spoke of the prostrate condition of New England manufactures, passed on 13th May, by a vote of one hundred and twenty-seven to forty.

On the 20th May an act was approved, reducing the duty on coffee, tea, and cocoa; and on the 29th, the duty on molasses was reduced to six cents a gallon, and a drawback allowed of four cents a gallon on spirits distilled from foreign molasses. An act, of the same date, reduced the duty on salt to fifteen cents a bushel until 31st December, and to ten cents thereafter.

In the discussion of these measures, and the question of internal improvements, in Congress and by the leading journals of the South, to which Dr. Cooper of Columbia College, South Carolina, was a prominent contributor, the doctrine of state sovereignity, and of the right of the local governments to annul any act of Congress, which a state might deem an encroachment upon its reserved rights, began to be distinctly asserted, particularly by the people of South Carolina. The right of Nullification, therefore, became the issue, in the great debate in the Senate, in January, between Mr. Hayne of South Carolina, and Mr. Webster of Massachusetts, upon the resolution of Mr. Foot, to limit the sale of public lands. Resolutions affirming the constitutionality of the tariff act of 1828, were adopted by the Legislatures of Vermont, Delaware, Louisiana, and perhaps others.

By an act approved May 31, the tonnage duties on ships and vessels of the United States, and of such nations as had abolished their discriminating and countervailing duties were repealed.

A bill before the Senate to recompense the heirs of Robert Fulton by the grant of a township of land, in consideration of the benefits rendered by him to the country, was rejected upon constitutional grounds.

Mr. Spencer, from the Committee on Agriculture, on 12th March, made a report, accompanied by a bill to promote the growth and manufacture of silk in the United States. The report, based upon the essays, and other information furnished by Mr. John D'Homergue, the son of an eminent silk manufacturer of Nismes, assisted by Mr. P. S. Duponceau, tended to establish the fact that American silk worms were more productive of silk than those of any other country,[1] but that the manufactured silk of the country was inferior, for want of practical knowledge and suitable machines for reeling, whereby it was rendered unfit for the finer fabrics; that every state was adapted to the cultivation of mulberries and the production of silk, and that if the culture were zealously prosecuted, the large importations of foreign silk, amounting in the last year to eight and one half millions, would be compensated by the export of raw silk, and the manufacture of silk stuffs be necessarily introduced. The bill drawn up, at the request of the committee, by Mr. Duponceau, after consultation with Mr. D'Homergue, proposed to devote forty thousand dollars to the establishment of a normal filature at or near Philadelphia, under the charge of the latter, whose departure from the

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(1) The proceedings of the Chamber of Commerce at Lyons, published early in the year, in relation to American silk, state that a sample of silk, reeled in Philadelphia by Mr. D'Homergue, was assayed by a sworn and licensed assayer, and was declared to be of an extraordinary quality and admirably adapted to the uses of fabrication. Its degree of fineness was sixteen deniers, and it would produce singles of fifty, organsine of thirty-two, and tram of wool and silk of thirty duts, a quality extremely rare in our country. American silk is fine, nervous, good, regular, clean, of a fine color; in short, it unites all the qualities that can be wished for. Its value was estimated at twenty-six francs (five dollars) a pound.

country the committee thought would be a national misfortune, and he was to be required to instruct gratuitously sixty young men in the art of reeling silk and preparing it for exportation, so as to become afterward directors of filatures, and at least twenty women, who were to be paid for their labor. The balance of the appropriation, after deducting expenses, and the materials, were at the end of two years to be the property of Mr. D'Homergue. No opportunity was found to discuss the bill during this and the following session, and it was lost in the next.

An experimental filature, with ten reels and twenty women, was, however, put in operation in Philadelphia during this year, by Mr. Duponceau, under the charge of Mr. D'Homergue, who was a skillful reeler. Two banners of Pennsylvania silk, of light but beautiful texture, each twelve feet long and six feet wide, were woven by the latter for Mr. Duponceau, and having been dyed by some Germans in the city, were exhibited with some smaller articles, as cravats, handkerchiefs, etc., at the Fair of the Franklin Institute, and at the ensuing sessions were presented, one to Congress and the other to the Legislature of Pennsylvania, and received with appropriate acknowledgments.

Mr. Rapp of Economy, Pennsylvania, who commenced the silk culture in 1828, and made from his first crop fifteen or eighteen yards of striped silk for female apparel and vestings; also made during the last year some black figured silk vestings, and one hundred black silk handkerchiefs, the first ever made west of the mountains, and wholly the product of his Society from the worm to the looms. Spirited efforts began to be made in nearly every part of the country, to produce raw silk for exportation. The "silk mania" may be said to have commenced at this date.

In accordance with an act of 29th May, the President issued a proclamation on 5th October, opening to British vessels the trade between the British colonial possessions and the American ports, having received satisfactory assurance that the colonial ports of Great Britain in the West Indies, South America, the Bahama and Bermuda Islands, would be opened to American vessels, which was accordingly done by an order in council, dated Nov. 5th.

It was estimated that there were at this time completed within the United States, 1343 miles of canals and other artificial navigation; 1828 miles in progress, and 408 projected. Of railroads, forty-four miles were completed, 422 in progress, and 697 projected. A valuable improvement in Western navigation, was the opening of the Louisville and Portland canal, around the Falls of the Ohio, on the 5th December, at a cost of $750,000.

The first locomotive constructed in the United States, is said to have been built this year at the West Point Foundry in New York. It was named the "Phœnix," and was built for the South Carolina Railroad, for which a second engine, called the "West Point," was built at the same place during the year. A third one, "the Dewitt Clinton, was constructed there in the following Spring, for the Mohawk and Hudson railroad, which, about the same time, imported the first Stephenson locomotive, afterward rebuilt, and called the "John Bull."[1] A model locomotive engine was built this year for the proprietor of Peale's Museum, in Philadelphia, by Mr. M. W. Baldwin, and attracted much attention during the next year, by its performance with a train of loaded passenger cars. A rotary steam engine, for propelling carriages on railroads, was patented this year, and exhibited by Mr. Ezra Child of Philadelphia, and recommended by Mr. Jones, editor of the Franklin Journal.

A new branch of the Carriage Manufacture, was about this date introduced by the construction of the first "Omnibus" in New York. During the next year, Mr. John Stephenson commenced the business on Broadway, where he built his first omnibus, and the second in that city. He has since been extensively known in connection with this branch of the trade, recently superseded in our principal cities by the introduction of horse railroads.

The manufacture of sugar mills for Louisiana and the West Indies, had become an important business at Cincinnati and Pittsburg. In addition to cotton, woolen, and other machinery, one hundred and fifty steam engines, and fifty sugar mills, were built this year at the former place, and one hundred steam engines at Pittsburg. Five rolling and three slitting mills, had been erected in Pittsburg in the last two years, and of the iron made there in the same time, six hundred tons were converted into other articles before leaving the city. The iron rolled this year was 9,282 tons.

The number of iron works built in the state, in the ten years ending January 1, was forty-nine, of which thirty were blooming forges and rolling mills, one a mineral,[2] and sixteen charcoal blast furnaces. The whole number of iron furnaces in the United States was estimated at 202, and their product 137,075 tons of pig iron, and 18,273 tons of castings: total, 155,348. In east Jersey, in a part of Connecticut, in a large district of New York, and in Vermont, bar iron was extensively made, by the process technically denominated "blooming," only a single operation from the ore, without the intervention of the blast furnace.

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(1) Historical Magazine, vol. 3, p. 150.

(2) The Mauch Chunk anthracite furnace, owned by the Lehigh Coal and Navigation Company, erected in 1826.

The total amount of iron made in the United States, was estimated as follows: bar iron made, 112,866 tons; bar iron castings, etc., estimated as pig iron, 191,536 tons, value $13,329,760; men employed, 29,254; persons subsisted, 146,273; annual wages, $8,776,420; paid for food furnished by farmers, $4,000,490. The average price of hammered iron was $96.66⅔ per ton; and of castings, sixty dollars, though much sold higher; and from the air furnace and cupola at four and one half cents a pound. The annual consumption of bar iron was about 130,007. The quantity of iron annually imported was about 33,986 tons.[1]

The value of domestic manufacturers exported this year was $5,320,980, which was a little below the average of the last five years. It included cotton manufactures to the value of $1,318,183, viz.: white piece goods, $964,196; printed goods, $61,800; Nankeen, a new manufacture, $1,093; twist and yarn, $24,744; all others, $266,350.

The cotton goods manufactured this year were estimated at 250,000,000 yards, including every kind, and worth, at ten cents a yard, $25,000,000. Four additional manufacturing companies were chartered in Massachusetts, to carry on the cotton manufacture at Lowell, viz.: the Middlesex Company, Suffolk Manufacturing Company, Tremont Mills, and Lawrence Manufacturing Company. The reduction in the price of water privileges, caused by the financial revulsion of the last year, which prostrated many cotton manufacturers in England, and those of slender capital in the United States, induced Messrs. Amos and Abbott Lawrence to enter largely into the business, in connection with the corporations above mentioned. The Boston and Lowell railroad was also incorporated and opened in 1835, and the town (now city) hall was built. The population of Lowell was 6,477, and six daily and one tri-weekly stage ran between it and Boston. The merchandise passing to and from Boston, for the corporations alone, amounted to ten thousand tons annually. The average price of Merrimac prints was 16.36 cents per yard, a reduction of 6.71 cents since 1825.

The manufacturing town of Fall River had increased in population, from 1,594 in 1820, to 4,259, and contained 20,357 cotton spindles, and 575 looms, making 100,105 yards of cloth weekly, a large calico printing establishment, rolling mill, and nail factory, a large woolen establishment, etc. The Exeter (N. H.) Cotton Factory went into operation in March, with a capital of $200,000, and 5000 spindles and 175 looms, employing 256 operators.

Cotton bagging of good quality was made in Providence, Rhode Island, from the waste of the factory. It was strong and heavy, weighing one and three quarter pounds to the yard, or one quarter

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(1) Report of the New York Convention of the Friends of Domestic Industry, 1831.

pound more than the best hemp bagging, and was sold at eighteen cents a yard.

The manufacture of cotton bagging, etc., by steam power, was commenced this year at Newburyport, Massachusetts, which contained the only stocking factory of any size then in the country. The latter, recently established by the Newburyport Hosiery Manufacturing Company, contained a number of looms worked by females, at each of which, about twenty stockings were made daily by one person. The hosiery was of every variety—wool, lamb's wool, worsted, and cotton, and successful attempts had been made with silk. The articles being deemed superior to English hose, were in great demand.

The manufacture of Hats and Bonnets of straw was a prosperous business in New England, where it had greatly extended within a few years. The annual manufacture of these articles in the United States, was estimated at more than one and a half millions. They were made in large quantities from rye straw by the females of Boxford, in Massachusetts, whose bonnets were sold in the cities as English bonnets, at ten to fourteen dollars each, the cost being only two or three. The machine in general use at this time, for pressing straw hats, consisted of three blocks, with a lever and pressing flat attached to each, and the rim, crown, and top were pressed by hand at three separate operations, by being removed successively from one to the other. Several improved machines were introduced within a few years after.

The domestic manufacture of Lace was estimated to be worth at least half a million dollars, and Artificial Flowers were made in many towns and villages of the country, a large proportion of those on sale being of American manufacture.

Nearly every description of Carpeting made in Europe, was at this time produced in the United States, of a quality nearly equal to the imported, and supplied much of the demand.

Gloves and Mittens of buckskin, to the value of $130,000, were annually made in Johnstown, New York, where the business was commenced many years before and is now extensive.

Many articles of hardware, and the finer manufactures of metals, began to be produced at this time in considerable quantity. Upwards of forty trading houses in Philadelphia, were supplied with gilt Buttons from the factory of Mr. Robinson, at Attleborough, Massachusetts, in which the labor was principally performed by females, assisted by machinery invented and patented by the proprietors within the last twenty-five or thirty years. There were several other button factories in the country whose manufactures were said to be cheaper than the imported. The manufacture of American wire-eyed buttons was about this time commenced, under a patent, at Haydenville, Massachusetts, by two brothers, named Hayden, of Waterbury, Connecticut, who, in 1838, employed two hundred hands, and a capital of $100,000, and in the following year added to it the manufacture of steel pens.

The large button factory of Messrs. Scoville & Co., at Waterbury, Connecticut, was destroyed by fire in March. That town contained three factories of gilt and other metal buttons, and one of ivory.

A manufactory of steel buttons, clasps, ornaments, and other fancy articles of iron and steel, with twenty hands, and a gilt button factory with twenty hands, making nine thousand gross per annum, worth $4.50 per gross, and not surpassed in quality, it was thought, by any imported, was in operation about this time at Paterson, New Jersey. About three thousand gross of Pearl and Bone buttons and moulds were annually made, by Daniel Buzzel, in Philadelphia, and metal, cloth, and other buttons, were made in many other places at this time, in great profusion.

An extensive manufactory of Brass Hinges, was established about this date at Troy, New York, the products of which, in quality and cheapness, rivalled those of Birmingham. The Globe Sickle Factory, at Pittsburg, was also established, and the manufacture of large circular, mill, pit, and cross-cut cast-steel saws, was commenced in Boston by Mr. Charles Griffiths, an English manufacturer, and under the firm of Welch & Griffiths has been continued to the present time. Carpenters' small cast steel saws were also made in New York, by Mr. Nichols, and by Mr. Rowland and perhaps one or two others in Philadelphia. Swords for the army and navy were furnished by N. P. Ames, of Chicopee, Massachusetts, by contract with the government.

About one and a half million pounds of American cut nails were this year exported to foreign countries.

Roofing slates were extensively manufactured at Easton, Pennsylvania, by James M. Porter, and in May a manufactory of roofing slates and slate pencils of superior quality was established at Baltimore by Thomas Symington, who employed machinery patented by him in November 1828. The price of roofing slates was said to have been reduced one third, under the existing duty.

Six shot factories had been erected in the Atlantic States since the duty on foreign shot was laid, and there were several others on the Mississippi. The shot tower of Paul Beck, on the Schuylkill, near Philadelphia, was said to be capable of supplying the whole United States with that article.

An improvement in the manufacture of Caoutchouc was made this year by Dr. J. K. Mitchell, of Philadelphia, who showed that India rubber bags, after maceration in sulphuric ether, could, by successive inflations and collapses, or by being rolled in its soft state, be made into thin bottles, or sheets of great size, and that after being cut with a wet knife, the edges would adhere so that the place of union would be scarcely visible. A similar discovery had been announced in England by Mr. Hancock, but his process was kept a secret.

A Fourdrinier paper machine is said to have been first successfully made in the United States this year, at Windham, Connecticut, since which time few, if any, have been imported. Cylinder machines, somewhat resembling the endless web machine, had been constructed and used many years before by Mr. Gilpin, of the Brandywine Paper Mills, who this year also patented an improved mode of finishing paper by passing it between calenders or cylinders to give it a polished surface. The Messrs. Ames & Co., of Springfield, Massachusetts, employed sixteen engines, and used on an average three tons of rags every twenty-four hours, making at the rate of eighty reams of the largest sized printing paper, and one hundred and eighty of foolscap or letter, equal to three hundred and ninety of the latter. They used machinery which produced the paper in an endless sheet, and was patented by them. It enabled one man to do the work of over thirty, and was considered superior to the foreign machine. The paper manufacture of the United States was further improved and cheapened about this date by the use of chlorine for bleaching colored rags, not previously used in making writing paper Patents were also obtained this year for making paper from wood, at the rate of five to seven reams to the one hundred pounds. Paper was also made in western Pennsylvania from fibres of the lime and aspen. Leathern paper, made from the refuse shavings and parings of leather, was also the subject of a patent. It was adapted to sheathing vessels. A manufactory of parchment was established at Pottsville, Pennsylvania.

The value of the books published in the United States this year was estimated at $3,500,000, of which $1,100,000 were school books alone. The increase, since 1820, was over forty per cent.

According to a report to Congress, the number of steamboats of all kinds on the waters of New York state, in November, was eighty-six, those on the North river and the Sound being the largest. They varied from three hundred and six to five hundred and twenty-seven tons. On the Mississippi there were one hundred and thirty steamboats, one hundred of which were of large size, averaging three hundred tons each.

The patents granted this year by the United States Patent Office, numbered five hundred and forty-four, of which one hundred and ninety were to New York, one hundred and forty-six to New England (fifty-two to Connecticut), eighty-eight to Pennsylvania, twenty-six to Virginia, twenty-four to Maryland, eight to New Jersey, nineteen to Ohio, one to Mississippi, one to Alabama. Twenty-seven were for threshing machines, chiefly to New York, eight for spinning jennies, six for machines for making hats, seven for steam engines, seven for grist mills, twelve relating to railroads, nineteen for churns, and twenty-one for washing machines. The following were among the number:

Eleazer Cady, Canaan, N. Y., Jan. 6, weighing boats and cargoes (called the tongue metre); E. F. Blank and Thomas Blank, New York, Feb. 16, making paper of leather cuttings and parings, etc.; Zechariah Allen, Providence, R. I., Feb. 23, dressing and finishing cloth; Charles Danforth, Paterson, N. J., April 1, spinning threstle. This valuable machine was introduced into England during the last year, where it was patented by J. Hutchin, Esq., and came into extensive use. Samuel Lane, Hallowell, Me., May 17, endless chain and railway horse power; Thomas Ewbank, New York, June 8, preventing explosion of boilers; Aaron B. Quimby, Hagerstown, Md., Oct. 1, preventing explosion of boilers; I. Loughead and J. B. Chapman, Philadelphia, June 11, guard for explosion of boilers; S. P. Mason, Leesville, Conn., June 24, reissued Dec. 29, cotton roping spinning speeder; Thomas Gilpin, Philadelphia, June 25, paper finishing machine; B. Toll and J. Doyle, Baltimore, Md., July 19, and John Kennedy, Baltimore, Oct. 1, making soap by steam; Lewis Wooster and J. B. Holmes, Meadville, Pa., Aug. 3, manufacturing paper from wood; E. H. Thomas and Nathan Woodcock, Brettleborough, Vt., Aug. 11, pulp dressers for making paper; Benjamin Greet, New York, Oct. 1, water proof hats of paper; Jacob Senneff, Philadelphia, Oct. 1, loom reeds; Joseph C. Dyer, Manchester, England, Oct. 1, twisting spinning speeder; John P. Bakewell, Pittsburg, Oct. 1, glass wheels for clocks; Festus Hayden, Waterbury, Conn., Oct. 1, American wire-eyed buttons; Isaac Adams, Boston, Mass., Oct. 4, power printing press; Richard Wood, New York, Nov. 4, apparatus of Neal's printing press; Isaiah Jennings, New York, Oct. 16, producing light by a combination of liquids to lamps without wicks. This was for the combination of alcohol and turpentine, since so extensively used under the name of patent "burning fluid."

The second annual Message of President Jackson to the twenty-first Congress, adverted to the subject of the impost revenue as a cause of
1831 congratulation, inasmuch as it promised the means of extinguishing the public debt sooner than was anticipated, and furnished a strong illustration of the practical effects of the present tariff upon the

commercial interests. Upon the constitutionality and effects of the tariff, we find the following arguments:

"The power to impose duties on imports originally belonged to the several states. The right to adjust those duties, with a view to the encouragement of domestic branches of industry, is so completely incidental to that power, that it is difficult to suppose the existence of the one without the other. The states have delegated their whole authority over imports to the General Government, without limitation or restriction, saving the very inconsiderable reservation relating to their inspection laws. This authority having thus entirely passed from the states, the right to exercise it for the purpose of protection does not exist in them; and consequently if it be not possessed by the General Government, it must be extinct. Our political system would thus present the anomaly of a people, stripped of the right to foster their own industry, and to counteract the most selfish and destructive policy which might be adopted by foreign nations. This surely cannot be the case; this indispensable power thus surrendered by the states must be within the scope of the authority on the subject expressly delegated to Congress. In this conclusion I am confirmed as well by the opinions of Presidents Washington, Jefferson, Madison, and Monroe, who have each repeatedly recommended the exercise of this right under the constitution, as by the uniform practice of Congress, the combined acquiescence of the states, and the general understanding of the people. * * * * *

"The effects of the present tariff are doubtless overrated, both in its evils and its advantages. By one class of reasoners, the reduced price of cotton and other agricultural products is ascribed wholly to its influence, and by another the reduced price of manufactured articles. The probability is that neither opinion approaches the truth, and that both are induced by that influence of interests and prejudices to which I have referred. The decrease of prices extends throughout the commercial world, embracing not only the raw material and the manufactured article, but provisions and lands. The cause must therefore be deeper and more pervading than the tariff of the United States. * * * * *

"The present tariff taxes some of the comforts of life unnecessarily high; it undertakes to protect interests too local and minute to justify a general exaction, and it also attempts to force some kinds of manufactures for which the country is not ripe. Much relief will be derived in some of these respects from the measures of your last session."

Mr. Mallary, chairman of the Committee on Manufactures, to which this portion of the message was referred, made a report on the 13th January, which concurred in the President's glowing view of the prosperity of the country, and in the benefits as well as the constitutionality of the tariff, but dissented from his opinion that its chief object should be revenue and protection a secondary one, when, as was then feared, the revenue was about to become too abundant. Protection "should be the *primary* object. The protecting power having once belonged to the states, and now transferred to the General Government, it may be used as the good of the nation demands, for a primary, not a secondary object. It ought not to be loosely attached to the skirts of revenue. Domestic industry is a single, great, ever pre-eminent interest of the nation." Other views of the principles and details of the tariff contained in the message were reviewed, and the soundness and natural character of its provisions were affirmed by the Committee, who believed that any attempt to change them after so recent a revision would be impolitic. A minority report on the subject from the same committee was also presented by Mr. Morrell, which also concurred in the President's favorable view of the practical operation of the tariff, which had not produced the injuries predicted to Congress, and in the soundness of his argument upon the constitutionality of protective import duties; but also agreed with him that a portion of the duties on necessaries and comforts of life should be repealed or reduced, and to adjust the whole revenue of the country, with a view to the protection of domestic industry.

A resolution submitted by Mr. Trevzant on 10th January, for instructing the Committee of Ways and Means to report a bill to reduce the duties on imported goods, to take effect after the payment of the public debt, was repealed by the House.

The Committee of the Senate on Manufactures, on 16th February, reported on a bill to reduce and fix the duties on imported sugars, stating the produce of the crops in Louisiana in the last year at one hundred thousand hogsheads, and that the land adapted to its cultivation would yield a sufficient supply for the whole United States, for fifty years to come. Under the duty of three cents, imposed in 1816, the sugar establishments had rapidly increased, and the price had as constantly decreased, and would continue, since the profit of capital employed in producing sugar was greater than that employed in product of rice, cotton, and tobacco, and would attract capital from those articles, until there was an equality of prices among them. Increased competition would reduce the prices. The sugar culture was an object of national importance, and should not be destroyed or checked, while in a train of successful experiments, by a reduction of the duty. An indefinite postponement of the bill was therefore recommended.

Judge Spencer, from the Committee on Agriculture, reported a resolution that the flag bearing the colors of the United States, presented to the House by Peter S. Duponceau, of Philadelphia, made of American silk, and prepared and woven by John D'Homergue, silk manufacturer, in the city of Philadelphia, be accepted by the House, and it be displayed in some conspicuous part of the hall of sittings of the House. The report was accompanied by the bill for promoting the growth and manufacture of silk, reported at the last session, and by further communications from Mr. Duponceau on the subject of the bill.

The same committee, on 3d February, reported on the memorial of the manufacturers of salt, in Kenhawa county, Virginia, praying for the restoration of the duty on imported salt, that the laws of the last session, reducing the duty, ought to be suspended. The article was one of the first necessity, the domestic sources adequate to a full supply, and the manufacture already existed in nineteen out of the twenty-four states. But it was in few hands and easily prostrated by a fall in price, while the importation was as easily monopolized, and the prices raised by a few merchants. About 2,400,000 bushels were made on the western waters in the last year, and the consumption was 2,800,000 bushels. The total manufacture on an average of the last five years, was 4,250,000 bushels, the importation 5,500,000, and the annual consumption 9,750,000. The price had steadily and rapidly declined in the western country, from two and three dollars a bushel, in 1820, to seventy-five cents, the average of the last year, and sixty-two and a half cents, the present price, and in some places as low as fifty cents. The manufacture, on any considerable scale, was but little over fifteen years old, and had been much extended and improved by the act of last session. They reported a bill to repeal so much of the act of May 29th, 1830, as had not gone into operation, which was finally laid on the table, as was also a bill supplementary to the same act, from the Senate.

A select committee, to whom was referred the petition of upward of three hundred mechanics, citizens of the city and county of Philadelphia, employed in the various branches of the iron manufacture, and that of the journeymen blacksmiths, of the same place, employed in manufacturing anchors and chain cables, reported on 28th February. The high duty imposed on bar iron by the act of 1828, was represented to be extremely unfavorable to the manufacturers of hardware, blacksmith's work, and chain cables, etc., which last could now be imported cheaper than the rods out of which they were made. Relief could only be afforded by a reduction of the duty on raw iron.

A bill, reported by Mr. Ellsworth, from the Committee on the Judiciary, to amend the several acts respecting copyrights, was passed and approved on 3d February, securing to authors a copyright for twenty-eight years, with a right of renewal for fourteen years more, if at the end of the first period he should be living, or leave a family. The previous act was for fourteen years without the privilege of renewal by his family in case of his decease.

The English excise duty of three pence the square yard on printed cotton goods, which was imposed in 1774, and raised in 1806 to three and a half pence, was repealed on the first March, of this year, and by way of partial compensation for loss of revenue thereby, the duty on foreign cotton wool was raised from six per cent. ad valorem to five shillings and ten pence per cent., but was reduced two years after to two shillings and eleven pence, cotton from British possessions paying only four pence per cent.

A very considerable decline in the price of cotton took place in the Southern States. Heavy failures occurred in June at Macon, Georgia. Cotton which had sold at nine and a half to eleven and a half cents, in the last autumn, was then worth only five to seven and a half cents.

The tariff of the United States, to which it was customary to ascribe the low price of cotton and other staples, was still the subject of much excitement. On the 3d August, an anti-tariff convention assembled at Augusta, and others were held in different states, at which delegates were appointed to meet in general convention at Philadelphia. The Free Trade Convention, which met accordingly at Philadelphia, on 30th September, and adjourned on 7th October, was proposed by Mr. H. D. Sedgwick, of Massachusetts, through the New York Evening Post, and was composed of about two hundred delegates, from fifteen states, who were presided over by Judge P. P. Barbour, of Virginia, Mr. Condy Raguet, of Philadelphia, acting as secretary. The Convention adopted a series of resolutions expressing attachment to the Constitution, and declaring the existing tariff laws of Congress, so far as they went to protect manufactures, to be a manifest violation of the true intent and spirit of the Constitution, inexpedient, unequal, oppressive and unjust, especially the act of May, 1828, which was oppressive to agriculture, commerce, and manufactures; that a solemn appeal should be made to the people, to unite in obtaining such a modification of the tariff as might be essential to all the important interests of the people, and calculated to quiet the fears and satisfy the reasonable demands of every section of the Union. An address to the people of the United States, of like import, was adopted, and a committee for each state was appointed, and instructed to draft a memorial to Congress, which they were to present at its next session, and promote, by their personal attendance, or by a sub-committee, in order to impress the views of the convention upon that body. The memorial, prepared by Mr. Albert Gallatin, was presented to Congress in February, 1832.

On the 26th of October a Tariff Convention of the Friends of

Domestic Industry, composed of upward of five hundred delegates from the New England and Middle States, Maryland, Virginia, Ohio, and the District of Columbia, met in New York, "for the purpose of taking into consideration what proceedings might be necessary for the support and further extension of the American system, as involved in the protection of the various pursuits of domestic industry." The Convention was organized, with William Wilkins, of Pennsylvania, as president, four vice presidents, and four secretaries, of/whom Hezekiah Niles, of Baltimore, was principal. Committees composed of one delegate from each state were appointed to prepare an address to the people of the United States, affirming the constitutionality of a tariff that would protect the interests of agriculture, commerce, and manufactures, which was written by C. J. Ingersoll, of Pennsylvania, chairman of the committee. 2. To prepare a memorial to Congress, enforcing the propriety of continuing the protection of domestic industry, whatever reduction of duties might be expedient on articles not conflicting with that industry. 3. To inquire and report upon the effect of the existing tariff upon the agriculture, manufactures, mechanic arts, internal trade, and foreign commerce of the country—A. H. Everett, of Masssachusetts, chairman; and, 4. A committee of seven to inquire and report upon evasions of the existing revenue laws. To the foregoing were added special committees to consider and report, severally, upon the production and manufacture of iron and steel, sugar and molasses, copper, lead, cotton, salt, wool, hats and cabinet furniture; paper, glass, porcelain and other manufactures of clay; culture of silk and hemp; on chemistry, on the currency, and on foreign tariffs.[1]

These conventions were each composed of men eminent for their respectability and practical knowledge of the important subjects discussed, and the addresses and memorials prepared under their direction are among the ablest expositions of the two great parties which now divided the country, on the subject of protecting duties, in our political annals. They had the effect of bringing the subject of the tariff once more before the National Legislature, at its next session, with such effect as to result in an entire review of its principles, and an attempt to reconcile the conflicting interests.

The reports of the several committees of the New York convention, after its adjournment, to the permanent committee, embodied a large amount of statistics and valuable information, derived from the members and from other sources, some of which has been given under

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(1) The thanks of the convention were voted to Matthew Carey and Hezekiah Niles for their long and able advocacy of the cause of domestic industry, and twenty thousand copies of the address were ordered to be printed.

previous dates. We give the result of their inquiries as containing what have been deemed reliable data respecting several branches of industry, and, in the absence of the usual official census of manufactures, at this time more to be depended upon than the voluminous report of the Secretary of the Treasury, made in obedience to a resolution of Congress at its next session, based upon information very imperfectly and hastily obtained, in answer to circular letters, and of which no digest has ever been made, or seems possible to be made with advantage.

From the best information that could be obtained, the Committee on Cotton, of which P. T. Jackson, of Massachusetts, was chairman, estimated the crop of the United States, after the year ending October 1, to be, in the Atlantic states, 486,103 bales of 306 lbs. each, equal to 148,747,518 lbs., and in the Southern and Western States, 552,744 bales of 411 lbs., equivalent to 227,177,784 lbs., giving a total crop of 1,038,847 bales, or 375,925,302 lbs. The domestic consumption amounted to more than one fifth of the whole crop; and the value of the product, allowing it to be increased fourfold in the process of manufacture, probably four fifths that of the cotton crop, and equal to the value of the whole quantity exported.

The following is a summary of the detail of the cotton manufacture in the twelve Eastern and Middle States, including Maryland and Virginia. But owing to misapprehension of the question respecting capital, only that employed in fixtures was returned, and some manufacturers were reluctant to give the details of their business, for which reasons it was thought that one fourth to one third might be safely added to the account. The statement was exclusive of no less than thirty establishments returned from the Southern and Western States, from which no accurate details were received, and also of family manufactures. The cotton mills in the twelve numbered seven hundred and ninety-five.

	Total in Cotton Mills.	Machine Shops.	Bleacheries.	Printeries.	Total.
Capital (principally in fixtures) in dollars,	40,614,984	2,400,000	900,000	1,000,000	44,914,934
Spindles in operation, ...	1,246,503				
Yards of cloth made, ...	230,461,900				
Pounds of yarn sold, ...	10,642,000				
Pounds of cotton used (214,822 bales),	77,757,316				
Hands employed (females 38,927), . .	62,157	3,200	738	1,505	67,600
Pounds of starch used, ...	1,641,253		429,625		2,070,873
Barrels of flour for sizing, ...	17,245			1,300	18,455
Cords of wood, ...	46,519			30,000	76,519
Tons of coal, ...	24.420		19,250	2,250	45,920
Bushels of charcoal, ...	39,203				
Gallons of oil, ...	300,338			2,800	303.138
Value of other articles in dollars, .	599,223	1,960,212	276,625	935,585	3,766,285
Spindles building, ...	172,024				
Hand weavers, ...	4,760				
Total dependents, ...	117.625	9.600	1,403	2,860	131,489
Annual value in dollars, ...	26,000,000	3,500,000	1,036,760	1,500,000	32,036,760
Aggregate wages, ...	10,294,944	1,248,000	209,814	402,965	12,155,723

Without opportunity for further inquiry, the Committee on Iron and Steel was able to enumerate fourteen steel furnaces, then in operation, capable of supplying sixteen hundred tons annually, an amount equal to the whole importation, but believed to be far short of the quantity really made. The furnaces were at the following places, viz: at Pittsburg two, Baltimore one, Philadelphia three, York county, Pennsylvania, one, New York three, Troy one, New Jersey two, Boston one. American steel was considered quite equal to English steel for agricultural purposes, and had excluded the latter altogether, the only steel imported being of a better quality, such as Swedish, blister, and sheer and cast steel. Iron of similar or equal quality to that which had given Great Britain the manufacture of the best articles of cutlery, had been recently made by improved processes, from Juniata ore, and that of Aucrim, New York, and Salisbury, Connecticut. Steel was made in Pittsburg, and could be made in New York and Connecticut, bearing a fair comparison with the best hoop L or Danamoura steel from England, all the iron made from Danamoura ore being monopolized by a firm in Hull. The second quality, or sheer steel, also an English monopoly, was now made by English artists in the United States, but attempts to make cast steel in the United States had not succeeded, owing first to a want of the best quality of blister steel, as a material, at reasonable price, and secondly to the want or expense of proper crucibles. These difficulties, it was thought, would be removed by the superior quality of Juniata iron for blister steel, and by the recent discovery of clay in Clinton, Clearfield, and Lycoming counties, Pennsylvania, and near to Baltimore, believed to be identical with the Stourbridge.

A statement of the iron and other manufactures in Litchfield county, Connecticut, gave the pig and bar iron made at $293,000; the manufactures of iron, including scythes, hoes, axes, tacks, shovels and spades, augers, steel, pitchforks, ploughs, etc., at $177,650,000; wool, woolen cloths, cotton cloths and hats, shoes, clocks, leather, buttons, etc., etc., $1,414,200; total, $1,884,850.

Mr. J. P. Crozer, from a committee of Delaware county, Pennsylvania, reported to the Convention the following establishments in that county, viz: rolling and slitting mills, four; nail factories, two; till mills (making edge tools, spades, and shovels), four; paper mills, thirteen; cotton spinning mills, thirteen, with 17,350 spindles; cotton weaving mills, three, with 420 looms; woolen mills employing 350 persons; total value of manufactures, $1,372,175; persons employed, 2,185.

The annual manufacture of hats in the United States was estimated at ten millions of dollars, and employed 15,000 men and 3,000 women, whose wages were $4,200,000. A foreign hat was seldom to be seen, American hats being regarded as cheaper, and about $500,000 worth were exported. The manufacture of caps was also extensive; one of three or four factories at Albany employing about 600 persons, and paying about $100,000 per annum in wages. The value of hats and caps for men's wear was put down at fifteen millions of dollars annually.

The Committee on Glass and Manufactures of Clay reported twenty-one furnaces in the United States (six of them in Boston and its vicinity), containing one hundred and forty pots for the manufacture of flint glass. Their total product of flint glass was $1,300,000, of which $400,000 was made in two of the largest at Boston, much of the latter consisting of cut glass. They were estimated to use 1,450 tons of lead, 900 tons of pearl ashes, 2,600 tons of sand, 1,000 tons of fire clay, and 100 tons of saltpetre. The manufacture had been greatly improved and extended under the protective duty of 1824, and the price was fully one third less than in 1816. Few if any orders were sent abroad for flint glass by American merchants. But one factory of black glass bottles, carboys, etc., was known to exist, and that was near Boston, with a capital of $50,000, and employing sixty-five men and boys. Its product was six thousand gross annually. The New England Crown Glass Company, near Boston, with a capital of $450,000, made crown window glass to the value of $100,000, and was the only factory of the kind except one recently erected at New York. The largest manufactory of green bottles, demijohns, druggists' wares, etc., was that of Dyott, near Philadelphia, employing two hundred and fifty to three hundred men, and melting about 1,200 tons per annum. There were twenty-three manufactories of cylinder window glass, four of which were at Pittsburg, four at Burnsville, Pennsylvania, and two at Wheeling, Virginia. The total value of the glass manufactured in the United States was about $3,000,000; the number of persons employed 2,140; persons subsisted 10,800; wages annually paid $720,000.

The value of Cabinet wares made was ascertained to be ten millions of dollars. The price was thirty per cent. less than it was a few years before, and a considerable value was annually exported to Canton, South America, and the West Indies.

The number of sugar plantations in Louisiana alone exceeded five hundred, one half of which were supposed to be worked by steam, the remainder by cattle and horses, and there were infant establishments in Georgia and Florida, all of which, it was thought would be ruined by a reduction of the duty of three cents on sugar.[1] The sugar refineries

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(1) It was argued in favor of the reduction of the duty on sugar for the refineries, that Lousiana could not produce sugar of sufficient strength for their use. The objec-

numbered thirty-eight, of which three were in New Orleans, eight in Baltimore, eleven in Philadelphia, eleven in New York, three in Boston, and one each in Salem, Massachusetts, and Providence, Rhode Island. A continuance of the duty would secure a large proportion of the refinery business to the United States.

The number of sheep in the United States was estimated at twenty millions, worth, on an average, two dollars a head. The capital invested in sheep and lands to feed them was about $105,000,000. The fixed and floating capital invested in the woolen manufacture was about forty millions of dollars, total capital in the growth and manufacture and the support of the manufacturers, $167,500,000. The number of persons employed, 162,000, requiring, for materials and subsistence, $250,000,000 worth of agricultural products yearly. New York probably produced one fourth of all the wool in the United States, and Massachusetts manufactured one fourth. Vermont, in the last year, sold wool worth $1,200,000.[1]

There were at least thirty chemical establishments in the United States, with an aggregate capital estimated at $1,158,000. They produced articles worth fully one million of dollars annually. Alum, copperas, and some other articles were produced to the almost total exclusion of the foreign. The manufacture included calomel and various other mercurial preparations, Glaubers and Rochelle salts, tartar emetic, ammonia, sulphate of quinine, oil of vitriol, tartaric, nitric, muriatic, oxalic and acetic acids, aqua fortis, Prussian blue, chrome yellow, chrome green, barilla, chloride of lime and of soda, refined saltpetre, refined borax, refined camphor, acetate and nitrate of lead, prussiate of potash, bichromate of potash. Additions were daily made to the list. Nearly all the materials used were the products of the United States, the only important exceptions being brimstone, saltpetre, cream tartar, and Peruvian bark, which few of the rival manufacturers possessed in their own countries.

The following estimate was made of the value of manufactures in the United States this year, viz:

Leather, thirty-five millions of dollars; hats and caps, fifteen; household and kitchen furniture, fifteen; wagons, coaches, carriages, etc., and agricultural tools, ten; coats, vests, and other tailors' work, ten; paper,

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tion was about this date removed by the introduction of Howard's process of boiling *in vacuo*, after previous concentration in open kettles. Thomas A. Morgan, and Godon & Forstell, were among the first to use the vacuum pan and process of Howard in Louisiana.—*De Bow's Resources*, vol. 3, p. 276. *Patent Office Report*, 1848, p. 218.

[1] The quantity of wool imported into Boston, in the first three quarters of this year, was 2,491,846 lbs., and the average of the two previous years was over half a million of pounds.

books, binding, newspapers, and stationery, ten; ladies' hats, caps, and bonnets, lace, artificial flowers, umbrellas, etc., eight; soap, candles, tobacco, buttons, penknives, wooden clocks, etc., seven; manufactures of iron, lead, and other metals, wool, cotton, etc., ninety millions; total, two hundred millions of dollars.[1]

Among the articles presented for the first time at the seventh exhibition of the Franklin Institute, in Philadelphia, in October, were samples of the natural yellow nankeen, made without dye, by Collett & Smith, of Paterson, New Jersey, black silk plush, made of American silk, with a very small admixture of foreign material, and remarkable for the quality of the silk, and the excellence of the manufacture, color, etc. The latter article was from the factory of Joseph Ripka, at Manayunk, who also received an extra premium for his green summer cloths, of cotton and worsted, the only imitation of the English article ever seen by the committee. Cutlery was also a new article. The Hon. John Forsyth, Senator from Augusta, Georgia, was awarded an extra premium for his enterprise in cultivating the variety of short staple cotton, from which the Aerumna nankeens, and those above mentioned, were made, as a substitute for the Indian fabric.[2] Col. John E. Calhoun, of Pendleton, South Carolina, was rewarded for cotton and woolen blankets for plantation use, made by him in the first manufactory of the kind in that state. Great improvements were noticed in the quality of the carpets exhibited, among which imitation Brussels carpets from the Lowell factory, and that of Mr. Givens, at Carlisle, Pennsylvania, were conspicuous—also, in flannels, printed cottons, stoves for anthracite, writing paper and Britannia ware, especially that of the Taunton Britannia Manufacturing Company of Massachusetts,[3] and in buttons, from Attleboro, Massachusetts, and Waterbury, Connecticut.

The Rockland flour mills, eight miles from Baltimore, were converted into a calico printing establishment, by Mr. Mellier, and printed 8,000 yards daily.

The number of pairs of ladies' boots and shoes made at Lynn, Massachusetts, in the year, was 1,675,781, valued at $942,171. The business employed 1,741 men, 1,675 women, and consumed $413,350 worth of materials.

The manufactures of Hampden county, Massachusetts, were ascer-

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(1) Niles's Register, vol. 39, p. 148.

(2) Georgia nankeen cotton was manufactured at Lonsdale, Rhode Island, in 1834.

(3) The Taunton factory of Reed & Barton, a firm still in existence, was probably the first to make rolled Britannia ware, and their work took the lead. Britannia teapots were also made by T. D. & S. Boardman, of Hartford, and Eben Smith, of Beverly, Massachusetts, and perhaps others.—*Letter from J. W. Quincy, Esq., of New York.*

tained to amount to the value of $2,191,000. The principal articles were cotton and woolen cloth, firearms, paper (39,324 reams), saddlery, harness, and trunks, whips, and leather. The cotton factories were sixteen, spindles 30,766, looms 712, artizans 4,099. At Chicopee 20,000 spindles were at work, and 13,500 yards of cloth made daily. Berkshire county had invested in manufactures $2,087,930, and the value of the products $2,006,965.

The Trenton Falls Company was incorporated in New Jersey, February 16, for the improvement of the extensive water power of the falls of the Delaware, and of the Assunpink creek, at Trenton.

The fine Porcelain and Chinaware manufactures of Philadelphia were pronounced by competent judges to be second only in point of perfection to those of France. The business was first commenced by William Ellis Tucker, whose experiments, during several years, in the manufacture and coloring of various clays, induced him, in 1825, to enlarge his operations by starting the first American Queensware manufactory in the old city water works, in Philadelphia. By successive improvements and much expenditure he was enabled to produce wares, comparing favorably in color, surface and gilding with the French. He was this year joined in the business by Judge Hemphill, of Philadelphia, and they established on a larger scale the American Porcelain manufactory, at Nineteenth and Chestnut streets, which, after Mr. Tucker's death the next year, was carried on by Thomas Hemphill, under his brother's patronage. They owned a fine bed of kaolin in Chester county.

A large steam cotton factory, two hundred feet long, commenced in July at Olneyville, Rhode Island, and another two hundred and seventy-five feet long, nearly completed at Fall River, Massachusetts, were among the largest in the country. A cotton factory was also projected at Nashville, Tennessee. At the cotton factory in Richmond, Virginia, slave labor alone was employed, except in superintendence.

Many useful and ornamental articles, as inkstands, sand-boxes, toys, etc., were made in Pennsylvania out of anthracite coal and lignite, for which a Mr. Kirk, this year, obtained a patent, under which Kirk's Patent Anthracite Wares Manufacturing Company, with a capital of $100,000, afterward commenced the business with a charter granted by the state, in March, 1838.

About sixty out of one hundred steam engines, at this time employed in Philadelphia, used anthracite coal for fuel.

James D. Allaire, proprietor of the Allaire works, Cherry street, New York, employed two hundred hands in the manufacture of steam engines, and other heavy iron work, to the amount of $140,000, in six months. He had other factories for making hollowware, sadirons, etc., in which four hundred hands were employed. In Pittsburg cast iron began to be used for pillars, the caps and sills of windows, etc.

The manufacture of corn brooms had become a large business in the United States, and was valued at several hundred thousand dollars. A machine had been recently invented by a young American for cleaning the material with great rapidity.

American power looms had nearly superseded the English, and were about this time introduced into England, where they became very popular. An improved power loom for weaving checks was at this period invented by Mr. Alfred Jenks, of Bridesburg, Pennsylvania, and was introduced into the Kempton mill, at Manayunk.

The public interest in the silk culture continued to extend, and raw silk was produced in small quantity, by individuals, in many parts of the country. The silk bill before Congress attracted attention to the subject, and much was expected from the Chinese mulberry and Morus Multicaulis, which was this year introduced into New England. The Legislature of Massachusetts manifested its interest by appropriating six hundred dollars for the completion and printing of a manual on the silk culture, for distribution throughout the state. The work, entitled a "Manual of the Mulberry Tree and the Culture of Silk," was prepared by Jonathan H. Cobb, of Dedham, Massachusetts, an early cultivator of the Multicaulis, and inventor of an improved silk reel, and contributed much useful information on the subject, although it contained many extravagant estimates of the profits of silk raising.

The American Railroad Journal was established this year, devoted to the interests of railroad enterprises, which had grown to considerable magnitude. It was edited and published by D. K. Minor and Henry V. Poor.

The "American Steam Carriage Company," composed of Col. Stephen H. Long, United States Army, William Norris, and others, was formed at Philadelphia in March, to build "locomotives" according to the plans of Col. Long, afterward secured by letters patent, and intended to use anthracite fuel. The first engine was built under Col. Long's superintendence, at the Phœnix Foundry, Kensington, but at its trial, on the fourth of July of the next year, proved a failure. A second one, finished in June, 1833, was successful, and in the following year three others were built by Messrs. Long and Norris, the latter of whom became about the same time sole proprietor of the business, which has since become one of the most extensive in the city, the works being known as the Norris Locomotive Works.

The first of a series of eight reports on the Geology of the State of Tennessee, was this year communicated to the General Assembly of the

State, by Professor Gerard Frost. The final report was made in 1846. Sixty patents were granted during the last and present year for threshing machines.

PATENTS.—Elizabeth Oram, New York, Jan. 12, globe for teaching geography; Charles Goodyear, Philadelphia, Jan. 12, manufacturing buttons, called the "safe-eye button;" De Grasse Fowler, New Brantford, Conn., June 13, manufacturing dead-eyed wooden buttons; Joseph Boston, New York, Feb. 11, manufacturing gas for illumination, etc.; Solomon Andrews, Perth Amboy, N. J., April 15 and May 5, manufacturing gas from oil and by spirit lamp; Henry Robinson, Boston, March 10, gas meters; Seth Boyden, Newark, N. J., March 9 and April 6, malleable cast iron; Thomas Blanchard, Springfield, Mass., March 25, steamboats for passage of rapids;[1] Asa G. Bill and George Spalding, Middletown, Conn., March 28, loom for weaving webbing, tape, etc.; Richard Willcox, Paterson, N. J., April 5, three patents for metallurgical apparatus, with anthracite and bituminous coal and charcoal; Moses Isaacs, Philadelphia, April 7, making coke from anthracite, etc.; George H. Richards, Washington, D. C., April 11, fluid caoutchouc to render articles water-proof—the first patent for this class of articles recorded; Daniel Strobel, jr., Washington, D. C., May 9, concentrating syrup and cane juice by steam; Thomas Oxmard, Cumberland, Maine, Aug. 6, apparatus for filtering syrup and washing animal blood used in clarifying sugar; John F. Nunns, New York, May 5, and Jesse Thompson, New York, August 6, action piano fortes; E. Fairbanks and T. Fairbanks, St. Johnsbury, Vt., June 13, balance for weighing heavy bodies, (reissued March, 1834, and again Feb. 1837.) This was for the valuable "platform scale," which has effected a great change in the system of weighing. Daniel Loring, Newark, N. J., Aug. 23, and Jas. Coulter, Philadelphia, Oct. 13, balances for weighing canal boats and loaded wagons, etc.; James Stimpson, Baltimore, Md., Aug. 23, wheels for railroad carriages; Samuel Krauser, Reading, Pa., Nov. 2, wheels for railroad cars, to prevent friction; D. Ames, jr., and John Ames, assignees of Samuel Eckstein, Philadelphia, June 13, machine for washing rags for paper—consisting of a wire cloth cylinder, to carry off the dirt beaten from the rags, as a substitute for the screens and washers then in use; Josiah W. Kirk, Schuylkill county, Pa., June 18, ornaments from anthracite coal, etc.; Peter Mintzer, Philadelphia, July 20, and W. H. Horstmann, Philadelphia, July 28, fly harness nets for horses; Isaiah Jennings, New York, Aug. 1, lamps for burning evaporable ingredients; Charles Goodyear, Philadelphia, Sept. 7, steel

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(1) This was a practical and ingenious improvement, for an account of which see Howe's Memoirs of Eminent Mechanics, p. 207.

spring fork; E. N. Sherr, Philadelphia, Oct. 6, guitar; James R. Stewart, New York, Nov. 11, dyeing cotton in the staple or cotton wool.

1832 The first message of the President to the twenty-second Congress spoke of the prosperous condition of Agriculture, Manufactures, and internal improvements, and of the scarcely less prosperous state of the foreign trade and navigation, which, in consequence of the improved relations of the country, had resulted in an increase of the revenue beyond the most sanguine expectations of the Treasury Department. The revenue of the year would not fall short of $27,700,000; and the expenditures for all objects, other than the public debt, would not exceed $14,700,000. The payments on account of the principal and interest of the public debt would exceed sixteen and a half millions; and the sum so paid since his inauguration would exceed forty millions of dollars. The condition of the public finances, and the certainty of the extinguishment of the public debt by redemption or purchase within the four years of his term, furnished an opportunity for carrying more fully into effect the policy recommended in his previous messages in relation to import duties: "A modification of the Tariff which shall produce a reduction of the revenue to the wants of the government, and an adjustment of the duties on imports with a view to equal justice in relation to all our national interests, and to the counteraction of foreign policy so far as it may be injurious to these interests, is deemed to be one of the principal objects which demand the consideration of the present Congress. Justice to the interests of the merchant as well as the manufacturer, requires that material reductions in the import duties be prospective; and unless the present Congress shall dispose of the subject, the proposed reductions cannot properly be made to take effect at the period when the necessity for the revenue arising from present rates shall cease. It is therefore desirable that arrangements be adopted at your present session to relieve the people from unnecessary taxation, after the extinguishment of the public debt. In the exercise of that spirit of concession and conciliation which has distinguished the friends of our Union in all great emergencies, it is believed that this object may be effected without injury to any national interests."

On the 9th January, Mr. Clay, recently elected to the United States Senate by the Legislature of Kentucky, submitted to that body the following resolutions:

"That the duties on articles imported from foreign countries, and not coming into competition with similar articles made or produced in the United States, ought to be forthwith abolished, except the duties on wines and silks, and that they ought to be reduced.

"That the Committee on Finance report a bill accordingly."

To the first resolution, Mr. Hayne, of South Carolina, moved an amendment to the effect that the duties be so reduced that the public revenue should be sufficient to defray the expenses of government according to their present scale, after the payment of the public debt; and that a gradual reduction of the high protecting duties take place until the rates should be equalized on all imports. This proposition, which was the utmost he could yield as a representative of South Carolina, was finally rejected; though ably supported by him and others opposed to the American system, which they declared unequal, unjust, and ruinous to the South, whose condition, Mr. Hayne assured the Senate, was "not merely one of unexampled depression, but of great and all pervading distress. Joint stock companies at the North had made large dividends, and flourishing villages had grown up under it, but the condition of the masses had not been improved, and the proposed reduction of duties on luxuries was only a measure to relieve the rich manufacturers of a portion of these burthens and to add to those of the South."

On the 19th January, the House of Representatives passed resolutions calling upon the Secretary of the Treasury to furnish information respecting the extent and condition generally of the manufactures of wool, cotton, hemp, iron, sugar, salt, and other articles manufactured to a considerable extent; and to accompany it by such a tariff of duties on imports as he might think best adapted to the advancement of the public interests;—also to obtain and lay before the House information as to the quantities and kinds of the several articles manufactured in the United States, particularly those of iron, cotton, wool, hemp, sugar, etc., and the cost thereof, as well as the quantities and cost of similar articles imported from abroad during the same year.

In conformity with these requisitions, the Secretary, Mr. McLane, issued circular inquiries calculated to elicit the information sought; and on the 27th April submitted a report, accompanied by a tariff bill repealing the act of 1828, and so altering and reducing the rates of duty on a large number of articles as to reduce the whole annual revenue from customs about ten millions, and that arising from protected articles about three millions; and the average rate of duty from about forty-five to twenty-seven per centum, leaving the total revenue from customs equal to about twelve millions annually. It was framed in accordance with these principles, and intended to harmonize both parties, but was satisfactory to neither.

Mr. McDuffie, of South Carolina, from the Committee of Ways and Means, also made a report to the House on the 8th February, along with a bill "to reduce and equalize the duties on imports." It proposed a uniform rate of twenty-five per cent. ad valorem on the more important articles, which rate was to be further reduced within one year to eighteen and three-fourths per centum, and within two years to twelve and one-half per centum and no more, on articles not already free or charged with a lower duty than twelve and one-half per centum.

Other measures were brought forward during the session by Messrs. Stewart, Dickerson, and Doubleday. The leading measure of the session, however, was a tariff bill reported by Mr. Adams, chairman of the Committee on Manufactures, on 23d May, "to alter and amend the several acts relative to duties on imports;" which was accompanied by a report on the subject. It was framed on the basis of the bill submitted by the Secretary of the Treasury, but was somewhat more favorable to protection. It passed the House, with some amendments, on 28th June; and, having received several additional amendments in the Senate, became a law on the 14th July, and was to take effect on 3d March following. This tariff made additions of some two hundred articles to the free list, enlarging it to about two hundred and seventy articles, including wool costing less than eight cents a pound, the teas of China and India, most tropical productions, and others not competing with domestic productions, many drugs, dye-stuffs, and chemicals. It reduced the duties on a large number of articles, and increased them upon a few, as china, stone and earthenware; but preserved the characteristics of a protective measure.

An official statement, emanating from the Treasury Department, estimated the amount of duties that would accrue under this tariff, calculated upon the importations of the year ending September 30, 1830, at $12,101,567, after deducting drawbacks and expenses—a reduction of $5,187,078 from the amount realized under the act of 1828.

The intense interest felt throughout the country on the subject of the tariff, as manifested by the memorials laid before Congress during the session from the Free Trade and Anti-Tariff Conventions of the last year, the numerous memorials and resolutions adopted by several of the local Legislatures, and by unofficial meetings held in various parts of the Union, approving or condemning any modification of the revenue system, was in no wise allayed by the passage of this act, which, though adopted with a view to conciliation, was unsatisfactory to the extremists of both parties. The agricultural interests of the South were generally arrayed against any measure retaining the features of a protective policy; and in South Carolina the spirit of Nullification had become exceedingly rife. At a State Rights and Free Trade Convention of delegates from every district but one in the state, held at Charleston on

23d February, at which Governor Hamilton presided, it was resolved to publish and circulate among the people tracts to explain and inculcate *Nullification* as the legitimate, peaceful, and rightful remedy for all oppressive and dangerous violations of the federal compact. An address to the people of the state was adopted, which characterized the bills before Congress as attempts to fasten the restrictive system upon the country, and to produce in effect "a steady discriminating *duty* of fifty per cent. on Southern, and a *bounty* of fifty per cent. on Northern industry." They did not propose to moot constitutional questions. That argument had been exhausted. They desired to give a more practical scope to their reflections. "The state looks to her sons to defend her in whatever form she may choose to proclaim her purpose to *resist*."

The Senators and Representatives of that state in Congress having issued an address to the people announcing that, by the passage of the tariff bill, the protecting system must be regarded as the settled policy of the country, that all relief from Congress was irrecoverably gone, and that it remained with the sovereign power of the state to decide what course to pursue. Another convention was accordingly assembled at Columbia in November, which, on the 24th, passed the famous ordinance to nullify the acts of Congress. It declared that the tariff laws of 1828 and July 14, 1832, were "unauthorized by the constitution of the United States, and violate the true meaning and intent thereof, and are null and void, and no law, nor binding upon this state, its officers, or citizens," etc. It was declared unlawful for any constituted authorities of that state or the United States to enforce the payment of the duties within the limits of the state; and the Legislature was instructed to pass acts to give full force to the ordinance after the 1st February following. Addresses were issued to the people of the state, calling upon them to prepare for the crisis; and to the people of the United States, explaining the causes of their hostile attitude to the General Government. An act of replevin was promptly passed by the Legislature, and an act to empower the Governor to employ the naval and military force of the state, and to subject all officers of the state to a test oath, with a view of enforcing the ordinance. The plan of taxation in which the convention declared itself willing to acquiesce "in a liberal spirit of concession, provided they were met in due time, in a becoming spirit, by the states interested in manufactures," was, the "whole list of protected articles should be imported free of all duty, and that the revenue derived from import duties should be raised exclusively upon the unprotected articles; or that whenever a duty is imposed upon protected articles imported, an excise duty of the same rate shall be imposed upon all similar articles manufactured in the United States"! The impolitic measures proposed by South Carolina in case this spirit of "concession" was not met by a tariff substantially uniform on all foreign imports, and limited to a revenue standard, called forth from President Jackson, on the 10th December, a proclamation, warning the authorities of the consequences of following the dictates of the Convention, and of the course he would be compelled to pursue. Under instructions from the state Legislature, then in session, a counter proclamation of open defiance was issued ten days after by Governor Hayne, the late Senator, who was succeeded in the senatorship by Mr. Calhoun, the reputed parent of the doctrine of state sovereignty, and of its legitimate fruit, nullification and secession, the latter having resigned the vice-presidency of the United States to occupy the Senate.

The nullification measures of South Carolina were condemned by different legislative and other public assemblies of states, north and south, many of whom were as much opposed to the tariff as herself. The energy of the executive was effectual in maintaining the authority of the laws; and on the 18th March of the ensuing year another state convention rescinded the nullification ordinance; but passed another to nullify what was called the force bill, for the collection of duties on imports, approved March 3, 1833.

In consequence of the intense feeling excited in Congress on the subject of the tariff, which had rendered the very word *manufacture* distasteful to many, the Silk bill, which had been pending during two sessions, having been pressed to a decision by its friends, was finally rejected by a small majority, chiefly, it is believed, on party grounds, under the plea that it was unconstitutional.

That measure, which was the first important evidence of a national interest in a branch of industry that promised to be renewed, or established with permanent benefit to the country, had excited no little attention in England, as opening a new source of supply of raw silk for her manufacturers, and had drawn to the United States a number of silk throwsters, weavers, dyers, and others skilled in the silk business, in the vain hope of finding employment. Specimens of *Gros de Naples*, made in England from silk sent to that country by the venerable P. S. Duponceau, President of the American Philosophical Society, by whom the bill had been drawn up at the request of a committee of Congress, arrived during the session, and were distributed among the members, and other fabrics from France were received after the adjournment. The measure is believed to have met with the private opposition of the French minister, M. Serurier, as one likely to conflict with an established industry of his own country. Though supported by many ardent friends, by memorials in its favor, and by the personal influence of Mr. Duponceau, whose character and patriotism commanded the highest esteem, the bill, after an animated discussion, was thrown out. The filature, established by that gentleman in Philadelphia, was suffered to go down, and public attention was prematurely turned to the more difficult art of manufacturing the native silk into fabrics for use, rather than the production of a raw material for exportation, by which it is possible silk raising might have been added to the staple industries of the country. Under the expectations created by the discussion of this subject in Congress, and by the press, the attention of agriculturalists, associations, and families throughout the Union, was earnestly given to this branch; and specimens of raw silk, sewings, and various silk fabrics, produced by private enterprise, continued to be received from sections of the Union widely remote, and gave abundant evidence of the facility with which the material could be produced in the United States. Connecticut offered a bounty of one dollar per hundred for mulberry trees, and fifty cents a pound for reeled silk, suitable for manufacture. A bill to encourage the propagation of the white mulberry, which was becoming the favorite variety, and the culture of silk, was introduced into the New York Legislature, and various measures to promote the same objects were adopted in other states.

The General Assembly of Pennsylvania, on the 4th of May, passed a general "Act to promote the Culture of Silk," authorizing the Governor to incorporate in each county a Society for the cultivation of the White Mulberry, with the privilege of establishing and conducting a manufactory of the raw material; and also to cultivate a farm, and establish a school or academy for the education of youth, to be so conducted as to combine labor and instruction,—the whole art and mystery of raising and manufacturing silk, to be taught, if desired by the students.

On the 14th July an act was approved, to release from duty iron imported for, and actually laid on railways or inclined planes.

The low price of railroad iron in England, occasioned by the extensive use of the process of coking bituminous coal for fuel, an art not then introduced into the United States, caused a greater part of such iron to be imported. It appears from a report to the Senate of Pennsylvania, that among the proposals to furnish railroad iron for the Columbia and Philadelphia Railroad, received in May of the last year, there were none for American iron, and contracts were made in England for the whole quantity, at £6 17*s.* 6*d.* per ton.

The first attempt was about the same time made to introduce the use of coke in the iron manufacture, by a bill to incorporate the "Pennsylvania Coke and Iron Company." It passed the Senate, but was lost in the House, and having been again brought forward in this year passed the House, after strong opposition, on the 16th of February, by a vote of fifty-one to forty-six. In Berks county, of that state, there were eleven iron furnaces and twenty-two forges. At Reading, where manufacturing operations first commenced about this time, the beautiful anthracite stoves of Dr. Nott's invention were cast. One of them, either from this furnace, or from Albany, is said to have been presented about the same time to the monks of St. Bernard, on the summit of the Alps. The counties of Sussex, Warren, Morris, and Bergen, in New Jersey, contained fifteen furnaces, and eighty-seven forge fires in operation. Great importance had been given to the iron mines of that region by the completion of the Morris Canal.

Eight joint stock companies, with an aggregate capital of four millions of dollars, were incorporated this year in Indiana, to construct railroads from the Ohio river to Indianapolis, and different places on the Wabash.

The number of railroads completed and in progress, on the first of January of this year was nineteen, of an aggregate length of nearly fourteen hundred miles, upwards of one hundred of which were already completed.

A company was incorporated in Mississippi, in March, to establish a Cotton manufactory, to be carried on by slave labor.

The eminent American naval architect, Henry Eckford, of New York, died on the 12th November, in the service of Sultan Mahmoud, of Turkey. In June of the last year, he finished for the emperor a sloop-of-war, and having soon after visited Constantinople, was offered and accepted the situation of chief naval constructor for the empire, and proceeded to organize a navy yard, and to lay the keel of a ship-of-the-line, in which service he died suddenly at the age of fifty-seven, when about to be made a Bey of the Empire, in acknowledgment of his professional abilities. He had previously furnished President Jackson with a plan for the entire reorganization of the American Navy, and made preparations to publish a work on Naval Architecture, and had also laid aside $20,000 to establish a professorship of Naval Architecture in Columbia College, under Mr. Doughty, an eminent naval constructor.

Works were erected at Jaffrey, N. H., for the manufacture of sugar and molasses from potatoes. according to a process described in Silliman's Journal.

The Patent Laws underwent some modification during this year. Among the patents issued were the following: to E. and T. Fairbanks, St. Johnsbury, Vt., Feb. 21, for balance for weighing heavy bodies; and to the same, Sept. 22, two patents for balance steelyards, etc.; John and Charles Bruce, Kings county, N. Y., March 13, machine for cutting crackers and biscuit. [It performed the whole work of the "batch," and turned out complete about two hundred pounds of biscuit per hour.] Eliphalet Snow, Mansfield, Conn., March 16, and Charles C. Greene, Windsor, Vt., May 31, for silk reels; Frederick A. Taft, Dedham, Mass., May 11, manufacturing paper for covered buildings; John Ames, Springfield, Mass., March 12, reissue of patent of May 14, 1822; to the same, Sept. 1, for sizing paper; to A. H. Jervis and Thomas French, Ithica, N. Y., Nov. 6, hot and cold cylinder paper press; Thomas Ewbank, New York, May 16, coating pipes with tin; John J. Howe, North Salem, N. Y., June 22, manufacturing pins. [This valuable machine formed the head of a coil of fine wire by dies, completing a pin at each turn of a crank, at the rate of forty to fifty per minute. The machines were introduced the next year by the Messrs. Hoe & Co., of New York. In 1835, the Howe Manufacturing Company was organized in that city to carry on the manufacture under the patent. It was also patented in England and France afterward.] Eliphalet Nott, Schenectady, N. Y., Oct. 25, anthracite coal stoves; Felix Fossard, Pittsburg, Pa., April 23, dyeing with alkaline prussiates;[1] Edward Evans, Salem township, Pa., tanning without the use of lime, or sweating hides. This method of unhairing hides by sweating had been previously known in Pennsylvania, Maryland, and Jersey, and about this time was generally adopted in the large sole leather factories of New York and other places.

In view of the great discontent manifested toward the tariff, by the Southern people, and which even threatened a disruption of the Union, as well as
1833 on account of the ample means in the public treasury for extinguishing the remainder of the public debt, amounting on the first of January to a fraction under seven millions of dollars, the President once more recommended to Congress a reduction of the duties on imports, to a scale adapted to a strictly revenue standard, as soon as practicable. "In effecting this adjustment," he says, "it is due in justice to the interests of the different states, and even to the preservation of the Union itself, that the protection afforded by existing laws to any branch of industry, should not exceed what may be necessary to counteract the regulations of foreign nations, and to secure a supply of those arti-

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(1) Specimens of blue broadcloth, denominated Lafayette blue, made at Dedham, Mass., and dyed by F. Tassard, Philadelphia, with prussiade of potash, were exhibited at the Fair in the American Institute, New York, in the following year. The mordante used was sulphate of iron, and the dye was believed to have many advantages over indigo. No country possessed so many facilities for the manufacture, which has since become an important one. This appears to have been the first use of Prussian blue or dye in this country.

cles of manufacture essential to the national independence and safety in time of war. * * * *

"Those who take an enlarged view of the condition of our country, must be satisfied that the policy of protection must be ultimately limited to those articles of domestic manufacture which are indispensable to our safety in time of war. Within this scope, on a reasonable scale, it is recommended by every consideration of patriotism and duty, which will doubtless always secure to it a liberal and efficient support. But beyond this object we have already seen the operation of the system productive of discontent. In some sections of the republic its influence is deprecated as tending to concentrate wealth into a few hands, and as creating those germs of dependence and vice which in other countries have characterized the existence of monopolies, and proved so destructive of liberty and the general good. A large portion of the people in one section of the republic declare it not only inexpedient on these grounds, but as disturbing the equal relations of property by legislation, and therefore unconstitutional and unjust."

Calculated upon the average importations of the last six years, the revenue from customs, at the rates payable after the 3d March of this year, were estimated by the Secretary of the Treasury in his annual report at eighteen millions annually; and the aggregate revenue from all sources at about twenty-one millions a year. The probable expenses of government for all objects other than the public debt were placed at fifteen millions, leaving a surplus of six millions. In conformity with the views of the President, and the reasons urged in the last annual report of the department, Mr. McLane proposed to limit the revenue to a sum consistent with an economical administration of the government; and expressed his conviction that "by a tariff formed on proper principles, the reduction of six millions now recommended might, for the most part, be made upon those commonly denominated protected articles, without prejudice to the reasonable claims of existing establishments."

By a resolution of the Senate of December 13, the Secretary was therefore called upon, with as little delay as possible, to furnish the project of a bill for reducing the duties on imports, in conformity with suggestions contained in his annual report.

The Committee of Ways and Means,[1] through Mr. Verplanck, a few days after, reported to the House a bill "to reduce or otherwise alter

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(1) The Committee on Manufactures in the House, to whom that part of the President's message relating to the tariff was referred, were unable to agree in a measure upon the subject, and asked to be discharged; but a very able report was made, on the 28th February, by Mr. Adams, on behalf of the minority, who dissented from the views expressed in the message.

the duties on imports." It went to repeal the act of 1832, passed after mature deliberation, and which had not yet gone into operation, and contemplated an annual revenue of fifteen millions of dollars, twelve and a half millions of which were to be derived from customs upon sixty to seventy millions of dutiable commodities annually imported. The rates proposed were from ten to twenty per cent., with variations in special cases, as upon lead, iron, spirits, wines, silks, etc.; and the bill was framed on the basis of the acts of 1816 and 1818, which were believed to have given ample protection to manufactures, as shown by their great increase from 1816 to 1824. The bill restored the duties on tea and coffee, and was favorable to the iron, coal, tobacco, and some other interests; but the duties on foreign cottons and woolens, by the abandonment of the minimum system, were lower than under the act of 1816, but the duty on wool and other materials was also reduced. This bill, which was intended as a concession to the South, the committee said, if adopted, might "serve as a basis for a financial system for many years." After a protracted debate, Mr. Verplanck's bill was recommitted to a committee of the whole, with instructions to report Mr. Clay's bill from the Senate instead, which passed the House on the following day by a vote of 119 to 85.

This measure, known as the *Compromise* Act, was introduced in the Senate on 12th February, by Mr. Clay, who, in explaining the principles by which he was guided in submitting a modification of the tariff, declared that he considered the protective system in imminent danger, and said: "When I look to the variety of interests which are involved, to the number of individuals interested, the amount of capital invested, the value of buildings erected, and the whole arrangement of the business for the prosecution of the various branches of the manufacturing arts which have sprung up under the fostering care of this government, I cannot contemplate any evil equal to the sudden overthrow of all these interests. History can produce no parallel to the extent of the mischief which would be produced by such a disaster. The repeal of the Edict of Nantes itself was nothing in comparison with it."

The act provided that where the duties upon imports exceeded twenty per cent. on the value thereof, there should be deducted, after the 31st December of this year, one tenth of the excess above twenty per cent., and that a like reduction of one tenth should be made every second year until the 31st December, 1841, when one half of the residue of such excess should be deducted, and the remaining half after the 30th June, 1842, from which time the duties upon imports were to be twenty per cent. The valuation was to be made at the port of entry, and the duties were to be paid in cash, the credit system being abolished.

Coarse woolens, costing not over thirty-five cents a yard, which, by the act of 1832, were admitted, as negro clothing, at five per cent. duty, by way of concession to the Southern States, were restored to the duty of fifty per cent. with other woolens, subject to the deductions provided for. Linens, stuff goods, and silks (except sewing, which paid forty per cent.) were admitted free of duty after June, 1842, as was also a considerable list of articles, including many chemicals, dye-stuffs, tropical products, and raw materials.

The bill having passed the House without much discussion, was carried in the Senate on the 1st March by a vote of twenty-nine to sixteen, and was approved on the 2d, and Congress adjourned on the following day. This act, by which discrimination in favor of domestic industry was practically abandoned for the time as an act of conciliation, was afterward regarded by the opponents of protection as in the nature of a compromise between the North and South, and therefore unalterable by subsequent legislation.

An amendatory act of 2d March restored the duty repealed by the act of July, 1832, on copper bottoms, still boilers, braziers, copper, and unmanufactured tobacco; and sheet and rolled brass were made subject to a duty of twenty-five per cent.

A bill (which passed and was approved on the same date) to provide for the collection of duties on imports, and known as the Enforcement Act, was introduced on the 21st January, and drew from Mr. Calhoun a series of resolutions defining the powers of government, and asserting the sovereignty of individual states; and, with the tariff discussion, elicited resolutions upon the subject of the tariff which Georgia and North Carolina pronounced unconstitutional. The new act, however, was regarded as acceding to their demands, and South Carolina, in convention, revoked her nullification ordinance two weeks after the passage of the act.

A report on the subject of Live Oak, made early in the session by the Secretary of the Navy, stated the number of live oak trees suitable for ship building growing on the public lands of the United States to be about 144,655. At an average of twenty cubic feet per tree they would furnish 2,893,100 cubic feet of timber. But the average was by some estimated at eighty cubic feet each, and a mean between the two of fifty feet would give 7,232,750 cubic feet. The first-named quantity would build one hundred and seventy-three vessels, one-fourth of them ships of the line, one-fourth frigates, and one-half sloops and schooners in equal proportion. The medium quantity would suffice for four hundred and thirty-three vessels, and the highest estimate six hundred and ninety-three vessels. The trees reported to be growing on private lands were 8,975, sufficient on the above estimate for ten to forty-three vessels. The actual use of live oak timber for small repairs of live oak vessels during the last thirty-five years was estimated at one thousand feet annually; and during the last ten years twelve hundred feet annually. The future demands were estimated at three thousand four hundred feet annually, for small or ordinary repairs. All the timber used in the frames of public vessels constructed since 1797 was about 974,363 cubic feet, or 27,838 per year on an average. The price for live oak timber suitable for ships of the line, delivered at the yards, was in 1799 $1.33 per cubic foot; in 1801, $2; in 1816, $1.55 for frames of seventy-fours; in 1827, $1.37 for the same; and in this year for frames for frigates $1.09 to $1.50. No further purchases of live oak lands or artificial cultivation of the tree was recommended.

A report was made, February 21, by the Committee on Military Affairs, in accordance with a resolution of the House, upon the expediency of employing a suitable person, in aid of the Topographical Bureau, to ascertain the mineralogy and geology of each of the several states of the Union, with a view to the construction of a mineralogical and geological map of the United States. The subject was recommended as one of great national importance, and an appropriation for the purpose suggested. The report said: "Whilst all the resources of industry in the United States have been deemed worthy the attention and protection of the government, the development of our immense mineral wealth has been left entirely to accident, and has not been fostered by that public encouragement which would have been followed by so many advantages to our own citizens, or would have raised the scientific character of our country abroad."[1]

A memorial from merchants of Baltimore asked for a reduction of the duty on common salt, or an increase of the duty on fossil salt; which last was imported at a duty of one cent a bushel, at a low freight, in British ships coming empty to Nova Scotia for timber, greatly to the benefit of the British and the injury of American shipping. A manufactory of rock salt in the State of Maine, using the imported article, was complained of as a monopoly, ruinous to the manufacturers of common salt. It was able to make and sell rock salt at twenty-five cents a bushel, while Liverpool common salt cost thirty-five cents, under a duty

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(1) The first complete geological survey of a whole state, under authority of government, was that of Massachusetts, made by Dr. Edward Hitchcock, who was appointed in 1830, and in 1831 made his first report on the Economic Geology of Massachusetts, and this year published a "Report on the Geology, Zoology, and Botany of Massachusetts," with plates.

of ten cents a bushel; and it was estimated to have made in the last year a clear profit of $100,000.

The House ordered two thousand copies of the Manual on Silk, published by J. H. Cobb, under the patronage of the Massachusetts Legislature, to be published for distribution by the members. About one dozen mills for the manufacture of silk goods had been erected in the United States, chiefly in New England, since 1828, with a view of using imported raw silk until a domestic supply could be had. By increased attention, several persons this year succeeded, as a few had done before, in raising two crops of silk, some of which was exhibited at the Fair of the American Institute in New York. The morus multicaulis was used as food for worms. A silk factory at Mansfield, Conn., under an English manufacturer, with swifts for winding hard silk, employed thirty-two spindles for soft silk winding, and two broad and one fringe silk loom. It had machinery enough to employ thirty broad looms and fifty hands.

The New England Lace Factory, at Newburyport, Mass., with a capital of $150,000, was incorporated; but was compelled to suspend operations four or five years after.

The manufactures of Meriden, Conn., amounted to about one million dollars in value. One company employed two hundred and fifty hands in the manufacture of Britannia wares, such as coffee pots and mills, spoons, waffle irons, signal lanterns, etc., to the value of $200,000 per annum, and another made to the amount of $25,000. The other manufactures were, wooden clocks to the value of $50,000; ivory, wood, boxwood, and horn combs, worth about $40,000; auger bits and rakes, $20,000; tinware, (its earliest extensive manufacture,) about $90,000; also Japanned ware, boots, shoes, etc. *Middletown*, in the same state, had manufactories of arms for the United States service, one factory making annually fifteen hundred rifles, milled in all the parts; another two thousand milled muskets; another twelve hundred guns, which were cast. There were also large factories of cotton yarn, broadcloth, webbing, combs, Gunter's scales, machinery, pewter, axes, tinware, paper, gunpowder, and jewelry; and about two hundred thousand coffee mills were made annually. The yearly value of its manufactures was about $700,000.

The capital invested in Manufactures in Lowell, Mass., was $6,150,000. The number of large mills (five stories high) in actual operation was nineteen, the spindles 84,000, looms 3,000, operatives 5,000, of whom 3,800 were females. 27,000,000 yards of cotton were annually manufactured from 200,000 bales of cotton, 150,000 yards of cassimeres, and 120,000 yards of ingrained, Brussels, and other carpeting, for all which the workmen received $1,200,000 per annum. There were two hundred machinists, who worked up six hundred tons of iron annually into machinery. Upwards of five thousand tons of anthracite coal, besides other fuel, it was computed, were consumed annually. There were only five factories in operation in 1831, which made from twelve to fourteen millions of yards of cloth per annum, equal to one yard per second.

Fall River, Mass., where the first cotton mill was erected in 1812, now contained thirteen cotton factories, one satinet factory, employing one hundred and fifty hands, and the Anawan iron works and nail manufactory. The cotton factories made about 9,160,000 yards annually. The largest was the Massasoit, which ran 10,000 spindles, 350 looms, and employed 400 hands, using 810,000 pounds of cotton. The whole number of spindles was 31,500, looms 1,050, hands employed 1,276, and the cotton consumed was 2,290,000 pounds. The calico works alone employed 260 hands, and the iron works consumed one thousand tons of iron annually. Population about five thousand.

The York Manufacturing Company, of Saco, Me., completed a new four story cotton mill in the place of the first one, which was destroyed by fire in 1830. They commenced operations under the superintendence of Mr. Samuel Batchelder, with eight thousand spindles, and within the next four years added two other large mills. They had also at this time a rolling mill and nail factory, which made four hundred tons of nails annually.

The high duties levied in Peru upon the principal American exports had caused a great decline in the trade with that country. With the republic of Chili, however, a treaty of amity and commerce had been made, and a valuable trade existed with its ports, which were the resort of American fishing vessels. From the 20th to 30th August of this year, 2,603 bales of one thousand yards each of American manufactured cottons arrived at Valparaiso. These fabrics had driven the English cottons out of the market; and the proceeds being paid chiefly in gold, enabled the ships to make a profitable return voyage by way of China. The exports to Chili this year amounted to $1,463,940.

The whole value of domestic cotton manufactures exported this year was $2,532,567; of which about $36,000 went to the East Indies, $213,000 to China, upward of $900,000 to Mexico, and the rest principally to Central America, Columbia, Brazil, Buenos Ayres, and Chili.

A locomotive engine, called the Pennsylvania, invented by Col. S. H. Long, U. S. A., and built in the last year by Matthew W. Baldwin of Philadelphia, was put upon the Philadelphia and Germantown Railroad in January of this year. This engine, which was about the first successful American locomotive, is said to have run a mile in less than a minute, and drew thirty-two tons at the rate of fifteen miles an hour. Its performance was not exceeded for several years. During this and the following year, five engines were built at the same factory; and the present extensive works of the proprietor on Broad street were completed. In the next three years about one hundred locomotives were built there, and numerous improvements have been made in the construction of locomotives by Mr. Baldwin and his associates.[1] A very successful locomotive was also constructed at this time by Mr. R. L. Stevens, of Hoboken, and placed on the Camden and Amboy Railroad, which then had but two others.

Nine railroad companies, with a capital of $7,140,000, were incorporated in New Jersey previous to this year. Since March, 1801, fifty-four turnpike companies were authorized in that state.

The New York Mechanics' Institute was incorporated April 24. It has established classes in modeling, machinery, architectural and ornamental drawing, a winter course of lectures, reading room, and library of six thousand volumes; all of which are free to mechanics, workingmen, and apprentices of the city.[2]

Mr. Mariner, of New York, this year introduced a process for coating leather, cotton, linen, silk, etc., and for making them into water proof India rubber garments. These fabrics were made by George Spring, 55 Pine street. India rubber shoes, hose, coats, life preservers, carriage traces, etc., were made at this time at the first American rubber manufactory, established in Roxbury, Mass. The foreman of the factory claimed the invention of a new and cheap solvent for caoutchouc, the receipt for which he kept secret, and deposited under seal in one of the banks, for the benefit of his heirs. Boots made in New York, and sent to South America, to be varnished with the fresh juice as it exuded from the tree, to be returned and sold as gum elastic boots, were exhibited at the American Institute Fair this year by J. M. Hood, of Wall street; along with garments from the Roxbury factory, a diving dress from Boston, etc. India rubber carpets were about this time made by Dr. Alexander Jones, of Mobile, of rich figures and beautiful colors, and impervious to water or grease, by covering successive layers of paper and wall paper glued to canvas with a varnish of India rubber. Neat durable carpets, made of good papering, cost about thirty-seven and a half cents per yard; and richer ones, adorned with gold or silver leaf, for one dollar to one dollar and fifty cents per yard.

A single publishing house in Philadelphia—that of Cary, Lea & Blanchard—were said to have paid annually during the last five years to American authors and writers the sum of thirty thousand dollars. The

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(1) Leading Pursuits and Leading Men, by E. T. Freedley, p. 302.

(2) French's Gazetteer of New York, 1860.

brothers James and John Harper, of New York, who in 1816 were journeymen printers, working at hand-presses in that city, now owned an establishment of their own, which was one of the largest in the city. It employed seven hand-presses, one horse-power press, (doing the work of seven hand-presses,) and 140 workmen; and they paid $100 per diem in wages, $200 for paper, and $1,000 per annum for postage.

The town of Newark, N. J., contained sixteen extensive factories of saddlery and harness, employing 272 hands, a capital of $217,300, and yielding a product of $346,280 per annum; independently of the coach makers, who made their own saddlery and harness. Ten carriage factories, having 779 workmen, and a capital of $202,500, produced carriages to the value of $593,000, including plating and lampmaking, etc., which was generally done by themselves. The shoe factories were eighteen in number, with 1,075 hands, and a capital of $300,000; and their product was $607,450. They consumed $400,000 worth of leather. Nine hat manufactories employed 487 hands; capital, $106,000; product, $551,700. Thirteen tanneries, with 103 hands and $78,000 in capital, returned an annual product of $503,000. In addition to these principal manufactures, there were also considerable manufactures of soap and candles, iron and brass castings, malleable iron, coach springs, tin and sheet ironware and stoves, a hardware manufactory, and two patent leather manufactories.[1] About two hundred thousand dollars worth of manufactures, principally shoes, were sent to New York in two days during this year.

The Novelty Works, for the manufacture of platform scales and domestic hardware, was established at Pittsburg, Pa., by L. R. Livingston.

There were Gimlet factories at Whately, Buckland, Keene, and in Franklin county, N. H., and one in Connecticut. The new twist gimlet was considered as much superior to the old English as the American screw-auger was to the old auger.

PATENTS.—William Edwards, Masonville, N. Y., Feb. 13, softening, breaking, and fulling hides. This hide mill, for softening and preparing hides by a process similar to the fulling of cloth, instead of soaking and breaking over the beam as formerly, was a valuable improvement. Robert C. Manners, Boston, Feb. 13, lithography applied to the printing of books; Sereno Newton, New York, Feb. 26, double cylinder register printing press—also for a double Napier printing press; Robert L. Stuart and Alexander Stuart, New York, March 7, applying syrup by steam in the manufacture of confectionery; Charles J. Gayler, New York, April 12, fire-proof iron chest; Joseph Francis, New York, April

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(1) Gordon's Gazetteer of New Jersey.

23, portable screw boats; Samuel D. Breed, Philadelphia, June 29, hose from cloth and gum elastic; Matthew W. Baldwin, Philadelphia, June 29, wheels for locomotive carriages and railroad cars; John Elgar, Philadelphia, Nov. 29, wheels for railroad carriages; James Bogardus, New York, Sept. 17, metallic slides and cases for ever-pointed pencils; Edward M. Converse, Southington, Conn., Nov. 19, a wiring machine for tin plate ware; Herrick Aiken, Dracut, Mass., Dec. 16, sockets or hafts for awls and other tools. [The pegging haft is deemed one of the most useful among the minor inventions connected with the shoe manufacture.] F. W. Geisenhainer, New York, Dec. 19, making iron and steel by anthracite coal; Obed Hussey, Cincinnati, Ohio, Dec. 31, machine for cutting grain. A public trial of this valuable reaper was first made in July of this year, before the Hamilton County Agricultural Society, near Carthage, Ohio; and the next year it was introduced in Illinois and New York, and soon after in other states. In 1838 the patentee established a manufactory in Baltimore. This machine, though not the first horse-power reaper, was superior to any in use, and cut grain as fast as eight persons could bind it.

1834 The usual excitement arising from the question of protective duties gave place, during the first session of the twenty-third Congress, to discussions growing out of the conflict between the executive department and the United States Bank. The President, in view of the expiration of the charter of that institution, on the 3d March, 1836, and in doubt of its constitutionality and solvency, and purity of action, as intimated in his message to Congress, directed the Secretary of the Treasury, before the re-assembling of Congress, to withdraw the government deposits from its vaults, and to lodge them with certain state banks, notwithstanding a vote of the House that they might be safely continued in that bank. The reasons for the removal of the deposits were communicated to Congress by Mr. Secretary Taney at the present session, and the act was virtually allowed; although numerous petitions were presented for the restoration of the government monies to the national bank.

The number of banking institutions in the United States had increased from three in 1791, with a capital of two millions of dollars, to 246, with an aggregate capital of $89,822,422, in 1816, when the United States Bank was chartered, until on the first of January of the present year, the number was 502, their united capital $168,827,803, their issues $78,342,528, and the specie in their vaults $17,368,430; the deposits amounting to $66,216,087. Including the bank of the United States, the whole banking capital of the Union at this time amounted to

$203,827,883; the issues to $97,550,907; specie in vaults, $27,394,667; deposits, $77,181,462; and discounts, $325,599,843.

The banks were distributed as follows: in New England 241, the proportion of whose notes to their capital was thirty-three per cent.; in New York, New Jersey, Pennsylvania, Delaware, and Maryland, 173, proportion sixty per cent.; Virginia, North and South Carolina, Georgia, and Florida, thirty-nine, proportion of notes seventy per cent.; Alabama, Mississippi, and Louisiana, eighteen, proportion of notes twenty-six per cent.; Tennessee, Kentucky, Ohio, Indiana, Illinois, Missouri, and Michigan, thirty-one, proportion fifty-five per cent. The whole circulation of the state banks was about forty-six per cent. of their capital; and that of the United States, including the national bank, a little less than fifty per cent. of their capital.[1]

Among the acts of the session was one of February 26 to authorize G. B. Lamar, of Savannah, Ga., to import, free of duty, an iron steamboat, with its machinery and appurtenances, for the purpose of making an experiment of the aptitude of iron steamboats for the navigation of shallow waters; one of June 30, empowering the Secretary of the Navy to examine and test a steam engine devised by Benjamin Phillips of Philadelphia, and such other improvements in the same line as might thereafter be presented, for which five thousand dollars were appropriated; one of the same date, appropriating eight hundred dollars to procure a marble bust, executed by an American artist, of the late Judge Ellsworth; and one modifying the duty on manufactures of lead.

A report on the subject of the coal trade, made by a committee of the Senate of Pennsylvania, stated that among other points they had been led to consider "whether the bituminous coal of Pennsylvania can be brought into general use east of the mountains for manufacturing purposes; and be transported to the eastern markets upon such terms as to supersede the use of foreign coals." The price of coals, since the commencement of the trade, appeared to have been little influenced by the tariff, but almost entirely by the scarcity and demand. In 1815, when the duty on foreign coals was three dollars and sixty cents, the price in New York was twenty-three dollars per chaldron of thirty-six bushels; from 1816 to 1823, under a duty of one dollar and eighty cents, the average price was about eleven dollars. Its price in 1821, under that duty, was fourteen dollars; and in 1830, when the duty was two dollars and sixteen cents, the price was only eight dollars. The average price from 1824 to 1834 was ten dollars; and in the latter year it declined to five dollars and five dollars fifty cents. The average increase in the

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(1) Pitkin's Statistics, 2d ed.

consumption of Pennsylvania coal since 1820 was a fraction more than one third yearly.

The existence of bituminous coal in Alabama was at this time first noticed by Dr. Alexander Jones, of Mobile.

In the manufacture of Carpets, which had rapidly increased in the United States within a few years, it was ascertained that there were in operation in December eighteen to twenty factories, containing at least 511 carpet looms. Of these, eighteen were for Brussels, twenty-one for treble-ingrained, 424 for other ingrained, forty-four for Venitian, and four for damask Venitian. They produced the following quantities of the several kinds, at an average value of one dollar per yard, viz.: Brussels, 21,600 yards; three-ply, 31,500; other ingrained, 954,000; Venitian, 132,000; damask Venitian, 8,400; total, 1,147,500 yards.

The American market was in a great measure supplied with domestic carpetings of all kinds. The average quantity imported from 1828 to 1832 was 536,296 yards, valued at the place of export at $416,944; and in 1833 the quantity was 344,113 yards, worth $319,592. In some states large quantities of carpeting of inferior quality were made in families, and in 1832 it was officially reported that four counties of New Hampshire exported to other states carpeting of household manufacture probably exceeding in value all the foreign articles consumed in them.

The total value of the domestic woolens and cottons consumed in the United States, with a population taken at fourteen millions—estimated according to the consumption in Great Britain, which was equal to $160,000,000, or ten dollars per head, and including Ireland, eight dollars per head—was $122,000,000; or at the lower estimate $94,000,000.

The aggregate value of all the manufactures of the United States was estimated at not less than three hundred and twenty-five to three hundred and fifty millions per annum.[1] The foreign articles consumed in the country, after deducting teas, wines, coffee, and spices, did not exceed fifty millions of dollars per annum.

The product of raw cotton throughout the world was this year officially estimated at nine hundred millions of pounds, of which the United States produced four hundred and sixty millions, in the following proportions: Alabama and Mississippi each eighty-five millions, Georgia seventy-five, South Carolina sixty-five and a half, Lousiana sixty-two, Tennessee forty-five, Florida twenty, Virginia ten, North Carolina nine and a half, and Arkansas half a million pounds. The total value of the crop was computed to be seventy-six millions of dollars, and the quantity exported was three hundred and eighty-four

(1) Pitkin's Statistics.

millions of pounds, worth forty-nine millions of dollars, which included eight millions and eighty-five thousand pounds of sea island cotton from South Carolina and Georgia.[1]

The quantity of cotton long cloths imported this year from the United States into China was 134,000 pieces, and of cotton domestics 32,743 pieces; while of cotton goods the whole importation into that country in British vessels was only 75,922 pieces. The importation of American piece goods was nearly double that of the previous year, amounting to 24,745 pieces. An extensive manufacturer of Glasgow, who had for several years supplied Chili with cotton domestics, spun and woven in his own works to the best advantage, had latterly been obliged to abandon the trade to American competition. At Manilla, 35,240 pieces of thirty inch and 7,000 pieces of twenty-eight inch American gray cottons were received, and only 1,882 pieces of Belfast manufacture. The ports of Rio de Janeiro, Aux Cayes, of Malta, Smyrna, and the Cape of Good Hope, were also overstocked with American unbleached cottons, to the exclusion of British goods, which they undersold.[2]

The rise in price of raw cotton during the last autumn caused many New England factories to stop work. The establishment this year of a cotton factory on a large scale, with the best machinery and many advantages, at Lynchburg, Va., was regarded as opening a new era to that section of the country.

The manufacture of cotton gins on an extensive scale was commenced at this time in Autauga county, Ala., by Daniel Pratt, a native of New Hampshire, who had been previously engaged in the business with Mr. S. Criswold at Clinton, Ga. The reputation of his gins extended rapidly throughout the Southwest, and in 1839 he laid the foundation of the flourishing village of Prattville, Ala., by building a saw mill, planing mill, flour and grist mill—the first of any note in the state—gin manufactory, etc.; and in 1846 added a large cotton factory, iron foundry, and other works. In the first seventeen years he manufactured about eight thousand cotton gins.[3]

A large manufactory of oil from cotton seed was established in the last year at Natchez, Miss., and others were building at Mobile, Ala., Florence, Ga., and Petersburg, Va. The oil was used for making paints, and when refined was said to burn well in lamps; and the oil cake was used as food for cattle.

A new machine for spinning flax and hemp for cordage was introduced about this time by Joseph Westerman of New York, which spun rope

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(1) Secretary Woodbury's Report.

(2) Ure's Cotton Manufactures, Bohn's Ed., vol. i. pp. xliii–iv.

(3) De Bow's Review, volume 10, page 226.

yarn from hemp without previous hatcheling, and without the consequent loss of eight to ten per cent. from that cause. The saving was so great that the rope manufacturers of Brooklyn dare not, it was said, introduce it into their factories in consequence of combinations among the spinners. The machinery to spin a ton of hemp per diem, including four machines called breakers, six finishers, two spinning and three doubling frames, a four horse power engine, etc., cost nine thousand dollars; and the total cost of spinning a ton of hemp was $17.50.

The manufactures of Manayunk, Pa., consisted at this time of Ripka's Silesia factory, with 7,176 spindles, 224 looms, and 300 hands; seven cotton mills, with upward of twenty-two thousand spindles and about one thousand hands; Hays' woolen factory, with fifty-seven hands, and Darrock's woolen and hat factory, employing fifty-seven hands; Newman's dyeing establishment, with eleven large vats and twenty-one hands; the Flat Rock Iron Works, with thirty-six hands; Rowland's saw finishing mill, turning out sixty mill-saws per week; Eckstein's paper mill, making three hundred reams weekly; and two flour mills, making two hundred and fifteen barrels of flour daily.

An act of the New York Legislature reduced the duty on salt made in the state from twelve and a half to six cents per bushel; and an amendment to the constitution, proposed this year and adopted the next, authorised the transfer of the salt duties, after payment of the canal debt, from the canal to the general fund of the state.

A State Geological Survey of Maryland was commenced this year by Dr. J. T. Ducatel, and was completed in seven annual reports.

A report to the Senate of Pennsylvania gave the quantity of anthracite coal sent to market from the Schuylkill coal region in the last year as 429,933 tons; and the capital invested was $5,022,780. The whole capital invested in the mining and transportation of coal, in canals, railroads, coal lands, working capital, etc., was $19,176,217, exclusive of storehouses, wharves, landings, vessels, etc., in Philadelphia and other places.[1]

During the last four or five years, many thousands of persons had engaged in gold washing in the Southern States; and the amount collected at this time in Virginia, North and South Carolina, and Georgia, was about one million dollars per annum. The product thenceforward fell off to one half that amount, until mining in the solid rock was attempted.

The number of Steamboats on the western waters was two hundred and thirty, and their tonnage was estimated at thirty-nine thousand

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(1) Taylor on Coal, 2d Am. Ed., p. 354, 362.

tons, and the expense of running them at $4,644,000. The number of American steamers on Lake Erie was thirty-one, which, with 234 schooners and three brigs, had a tonnage of 30,168. The first Association of steamboat owners was formed at Buffalo during the last year, where eleven steamboats, costing $360,000, were employed; and three trips were made to the upper lakes, two to Chicago, and one to Green Bay. One of the trips to Chicago occupied twenty-five days, and another twenty-two days; it has since been made in four days by a sailing vessel. The association employed eighteen boats this year, worth six hundred thousand dollars.

Refined Sugar, which had become an article of exportation, employed at this date thirty-eight refineries in the United States, the total product of which was estimated to equal at least two millions of dollars. Prime Louisiana sugars had proved on trial to be equally valuable for refining with those of the West Indies. A large refinery, lately established near New Orleans, used thirty hogsheads of raw sugar per diem. A knowledge of the art was promoted by the publication this year of a "Manual on the Cultivation of the Sugar Cane, and the fabrication and refinement of sugar," prepared by Professor Silliman, in compliance with a resolution of the House of Representatives of January 25, 1830.

Great perfection was at this time exhibited in the art of casting in iron. The product of different establishments in the United States showed fineness and beauty of workmanship, as well as elegance of design. The iron castings made at Albany, New York, were particularly noted for their excellence, and were considered equal to any in the world. The hollowware of Bartlett, Bent & Co. was preferred to the best Scotch castings, and the stoves of Dr. Nott received the preference wherever known. The machine castings of Maury & Ward were equal to those of any country. Five establishments in the town melted annually about 2,500 tons of iron, and gave support to about four hundred persons. Elegant fruit dishes, with open flower work, cast, and then rendered malleable so as not to break, as well as breastpins of Napoleon, and other iron ornaments, rendered fashionable in Europe by the example of the Queen of Prussia, were made at the foundry of Seth Boyden, in Newark, New Jersey, who held letters patent for the process of rendering castings malleable. Beautiful specimens of small statuary, and other fine castings, rivalling those of Germany, were made at the foundry of Mr. Francis Alger, in Boston.

The recent progress in the manufacture of American Hardware was indicated by the increasing number of articles of domestic production which began to compose the ordinary stock of the hardware merchants, as well as by the improved quality of the goods. Several dealers in the principal cities were at this time chiefly, or altogether devoted to the sale of the American hardware, generally consigned to them by the manufacturers, and sold almost exclusively to the trade.[1] The samples

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(1) Upon the early history of the American Hardware trade, we have been favored with communications from gentlemen connected with it from its origin. Some interesting reminiscences upon the subject have been sent to us by John W. Quincy, Esq., of New York, who has been identified with this branch of the trade from its commencement to the present time—first in Boston, and for the last quarter of a century in New York. His large and intelligent acquaintance with the subject gives authority to his communication, which we should be glad to give entire if our space permitted. We learn from him, and Mr. Hand of Philadelphia, that about the year 1827, or 1828, Mr. Amasa Goodyear, a manufacturer for many years of hay forks, buttons, and other articles at Salem village, near Waterbury, Connecticut, (who had been accustomed to take orders by semi-annual visits to the city, storing his goods in the warehouse of Mr. David W. Prescott,) opened in Church alley, in connection with his son, the late Charles Goodyear, of India rubber celebrity, and under the management of the latter, a small store, which, it is believed, was the first in the United States for the sale of American hardware. A. Goodyear & Son having failed, through speculations of the junior partner in real estate, the business, in January, 1831, passed into the possession of Messrs. Curtis & Hand, by whom it is still conducted, and who exerted themselves to give currency to various articles of home manufacture. About the former date the business was also commenced in New York by Christopher Hubbard, afterward Casey and Hubbard, who were followed in 1829 by George H. Gray & Co., and Hasner and Green, of Boston. At that time there was but one hardware store in the country of one hundred feet in depth, those of forty to sixty feet deep being considered first class stores, and a rent of $1,000 per annum rather a high one. The number of articles of domestic hardware, kept or to be obtained by the largest dealers was quite limited, and embraced many small articles, as shell and other buttons, which have since passed to other branches of trade. Among the staple articles kept by the earliest dealers were Goodyear's patent molasses gates, Fenn's patent cookstop and leather faucets, cast bits and screws (not very saleable), nail, shoe, and side strap hammers (among which those of Charles Hammond, of Philadelphia, and Mr. Eastman, of Concord, New Hampshire, were well known), wooden awl handles, Rowland's mill saws, the circular and handsaws, and wood-saw web, of Welch and Griffiths, of Boston (whose brand was already in repute), spinning-wheel heads of home invention, Britannia wares, carpenters' planes, manure and hay forks, shovels, scythes, &c. Even all of these had not come into use as early as 1828 or 1830, but the list of American articles purchased and sold by hardware dealers, at the close of this year (1834), embraced the following goods furnished by Mr. Quincey from a record before him. Some of these articles were still more or less largely imported as well as made here, and are marked thus [*]. Iron and brass wire seives, cotton, cattle and wool cards, board coffee mills, brass andirons, *brass head shovel and tongs, cast iron circular gridirons, bung borers and reamers, *iron wire, *Britannia tea and coffee pots, wood faucets, wheel-heads, hoes (not planters'), *scythes, cow bells, japaned lamps, blackball, *bulls-eye and dark pan hand-bells, pewter faucet and molasses gates; lines, mackerel and small hemp, bed cords, clothes lines, window cord, coil rope of hemp and manilla; *brushes, viz., scrubbing, floor, paint, furniture, horse, shoe, hair, varnish, dust, sash, hearth, etc.; sand boxes, *scale beams, sad iron stands of zinc; sleigh bells, raw hides, *inkstands, *gunter scales, *board rules, gauging rods, *pocket rules, two and four-fold; britannia tumblers and ladles; whipthongs, mouse traps, *guns, bellows, *coopers' axes, *adzes and draw-

were generally limited to a few shelves, and the profits were extremely small, compared with those on hardware. The general prejudice was strongly in favor of foreign goods, and the introduction of a new article of domestic manufacture was extremely slow and difficult for many years, the prejudice only giving place by degrees to the manifest superiority in quality or cheapness of the latter. The limited and fluctuating character of the protection, as yet afforded by the tariff, also retarded the growth of this branch.

Hammered brass kettles or battery, began at this time to be first made in the United States, at Wolcottville, Connecticut, by Mr. Israel Coe. It has since been extensively manufactured by rolling at Birmingham, in the same state and elsewhere.

Wood screws were this year first made by machinery at Providence, Rhode Island, where the New England Screw Company, and another company in the same business, were organized within a few years, and employed a capital of $200,000, making daily two thousand gross of brass and iron screws. The quality of the screws made there was such that they soon superseded James' celebrated English screws, notwithstanding the mercantile prejudice in favor of foreign articles. The business in that city has recently exceeded the value of one million dollars per annum.

N. P. Ames, and his associates, who employed at Chicopee Falls twenty-five to thirty men in making cutlery, and finishing swords by contract with the United States government—having been incorporated as the "Ames' Manufacturing Company," commenced operations this year in a new establishment, erected at Cabotville. They employed a capital of $30,000, afterward increased to $200,000, in the manufacture of arms, tools, cutlery, etc., to which they added, two years after, a foundry for casting bronze cannon and church bells, and in 1845, an iron foundry for machinery, etc., nearly all of which branches are still carried on extensively, in addition to some others. Gold and silver-mounted swords were made also by W. F. Widmann, of Philadelphia,

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ing knives, *steelyards; cut tacks and brads, sheet nails, patent awls, *iron candlesticks, mahogany knobs for drawers, steel squares, *brass spring door catches, *screw drivers, *plated squares and bevils, *brass nails, *awl hafts, *mincing knives, *spring shoe punches, *gimblets, coopers' braces, gut and bone whips, *japaned door latches, *circular saws, glass knobs, timber scribes, shingling, lath and axe hatchets, scratch awls, hooks and eyes, silver ever-point pencil cases, *razor strops, screw augers, auger bits, *pocket books, *lead pencils, bone mould and suspender buttons, *soap, axes, waffle irons, oil stones, blind fasts, *mill, cross-cut and tenon saws, manure and hay forks, *shovels, spades, *glue, planes, *sadirons, *Bristol brick, cast iron cart and wagon boxes, brass head dogs, scythe-rifles, wood-saw frames.

and a year or two later, the largest manufacturer of swords in the country was Robert Keyworth, of Washington city.

Tailors' cast steel shears, with German silver and malleable iron handles, and carving knives, made by R. Ward and R. Heinish, of New York; framing chisels, by Wolcott & Russell; mortice chisels, by Gay & Galloway; augers, by Dwight & Sons; bank and store locks, with 16,382 combinations (afterward picked and improved upon by Newell), made by Andrews & Co., of Perth Amboy; with brass and copper wares, from Ludlam's factory, were among the goods exhibited at the American Institute, during the last autumn.

American axes and locks were acknowledged to be the best in the world. There were two axe factories at New Haven, Connecticut, those of Alexander Harrison, and of Collins & Company—the latter was capable of finishing two hundred axes per diem, the former one hundred and fifty. The steam axe factory of Mr. Maule, twelve miles from Wheeling, Virginia, manufactured to the value of $10,000 per annum. Door locks began to be made there the next year by Pierpont & Hotchkiss.

Oliver Ames, of Easton, Massachusetts, had at this time three extensive shovel factories—one at Easton, one at Braintree, and one at West Bridgewater. He employed nine tilt hammers, and could turn out forty dozen shovels a day, each shovel passing through twenty different hands, and his profits were estimated at $15,000 per annum.

A factory, which employed one hundred and fifty saws, was erected at Black river, in Plymouth, Vermont, for the manufacture of marble, from the white and variegated primitive limestone. *Scagliola*, or composition marble, both plain and sculptured, of various colors and fine polish, was about this time first successfully made in New York, by Clark and Dougherty. Friezes, capitols, and other composition ornaments, are noticed as new articles in New York, at this date.

Experiments made by Dr. Jones, of Mobile, showed that paper of excellent quality could be made from the husks of Indian corn, and various kinds of wood and bark, particularly that of several kinds of poplar, birch, and other trees. Several reams of good printing paper were made this year by Dr. Daniel Stebbins, of Northampton, Massachusetts, from the foliage and bark of the mulberry tree, as in China. During the year Mr. Stebbins obtained from China probably the first seeds received in this country of the genuine Canton or Chinese mulberry tree, and in order to encourage the making of bark silk paper, etc., from its bark and leaves, he erected a large cocoonery, and kept up a nursery of the trees for many years, without eventual success.

The manufacture of "pressed glass," by means of metallic moulds, in imitation of cut glass—an American invention—was this year introduced into England by Messrs. Richardson, of Strowbridge.

PATENTS.—Samuel P. Mason, Killingly, Conn., Jan. 17, spinning cotton and silk; Charles Goodyear, Philadelphia, Feb. 5, faucets or molasses gates; Nathaniel Benedick, jr., Abel Benedick, and A. H. Hotchkiss, Sharon, Conn., Feb. 10, cast iron sleigh runners; Lot Brees and Ezra Brees, Luzerne county, Pa., Feb. 10, double grooved cast iron sleigh shoes; John H. Hagenmacker, Philadelphia, Pa., Feb. 11, new American silver; Daniel Neall, Philadelphia, Feb. 13, Wm. R. Collier, Washington, D. C., April 11, Otis Tufts, Boston, Aug. 22, and Adam Ramage, Philadelphia, Nov. 19, each for a printing press; James Sellers, Philadelphia, Feb. 18, covering window and other frames with wove wire; Margaret Gerrish, Salem, Mass., manufacturing the external fibres of the Asclepias Syriaca; James Bogardus, New York, April 7, gold cleaner; Levi Ward, assignee of Phœbe Atwell, Walworth, N. Y., April 30, extracting fur from skins and manufacturing it into yarn; Edwin M. Chaffee, Roxbury, Mass., May 17, making boots and shoes from India rubber leather; Isaac Fisher, jr., Springfield, Vt., June 14, four patents for making, softening, etc., sand paper; Cyrus H. McCormick, Rockbridge Co., Va., June 21, cutting grain of all kinds. [This was for the celebrated reaping machine, which took the great medal at the World's Fair, in London, in 1851. It will cut twenty acres a day. The patent was renewed in 1845, and has recently expired, having yielded the patentee between one and two millions of dollars.] James Rennie, Lodi, N. Y., Aug. 9, dyeing and printing with two or more colors at one impression; Samuel Guthrie, Sacketts Harbor, N. Y., Aug. 21, percussion powder for discharging arms; M. W. Baldwin, Philadelphia, Sept. 10, steam engine, locomotive, and cars; Henry Blair (colored man), Glenross, Md., Oct. 14, seeding corn planter; Henry Burden, Troy, N. Y., Oct. 14, furnace for heating bar iron; Patrick Mackie, New York, Oct. 16, and Dec. 3, covering ropes with caoutchouc; John W. Cochran, Lowell, Mass., Oct. 22, rotary cylinder cannon; reissued for many-chambered cannon, March 23, 1836, in which year a factory in Springfield, Mass., made eight of Cochran's many-chambered rifles weekly; Dennison Olmstead, New Haven, Conn., Nov. 5, furnace for anthracite; reissued Oct. 14, 1835; Charles Woodworth, Barre, Me., Nov. 17, and Dec. 23, machine for splitting palm leaf.

1835

The State of New York contained in January of this year, according to the State Census, among other manufacturing establishments, one hundred and twelve cotton factories, two hundred and thirty-four woolen, thirteen glass, sixty-three rope, seventy paper, and twenty-four oil cloth factories, and two hundred and ninety-three iron works.

The cotton mills employed a capital of $3,669,500, spindles 157,816, hands 12,954, and produced upward of twenty-one million yards of cloth. The woolen, cotton, and linen cloths made in families, amounted to more than eight and a half million yards. The number of sheep in the state was about four and a half millions.

An official but defective census of Illinois, gave in that state three hundred and thirty-nine manufactories, nine hundred and sixteen mills, eighty-seven manufacturing machines, and one hundred and forty-two distilleries.

Samuel Slater, the father of the American cotton manufacture, died at Webster, Massachusetts, on the 20th April, in the sixty-seventh year of his age.

Considerable excitement began about this time to be manifested, particularly in New England, on the subject of the silk culture, and the rearing of the mulberry tree. The interest shown by Congress, and by several of the state legislatures, within the last few years in the promotion of silk growing, by means of publications, bounties and other measures, had turned the attention of many agriculturalists and others to the cultivation of different kinds of mulberry. Among these the Morus Multicaulis, Chinese, or Perottel mulberry, recently introduced into Europe and America, though not superior if it was equal to some others, began to be regarded as the best for feeding silkworms. Its supposed ability to stand the coldest winters, to afford two crops of foliage in a season, the size and profusion of the leaves, and the facility with which they could be collected from its numerous low stalks, and the ease with which the tree could be propagated by layers and cuttings, contributed to its popularity.

Large profits were made by the sale of the young plants of that and other species and varieties of mulberry, which severally had their advocates, and many were induced to engage in the "silk business," as it was called, and which a few years after degenerated into a mere speculation in trees, to the permanent discredit of silk raising in the United States. Among those whose successful enterprise at this time added to the prevalent excitement was Mr. Whitmarsh, of Northampton, Massachusetts, who, during the last year, visited Italy and France to obtain information from the best sources, and returned with a considerable quantity of seeds of a variety of the Chinese mulberry in repute there, which he denominated the Alpine, and added to his collection. He was said to have sold, before the close of this year, mulberry plants to the value of over twelve thousand dollars, the cost of which was less than one thousand. He had also a large Cocoonery erected about this time, with a small engine for moving the reals, designing to use exclusively the Multicaulis, on which he subsequently published a treatise. Mr. William Kenrick, an eminent horticulturist of Newton, Massachusetts, had also a nursery of the same kind of trees, which he was instrumental in bringing into popular favor. He also published this year a useful manual, called the "American Silk Growers' Guide," recommending an American system or successive crops of silk in the same season.[1] A plantation of 25,000 mulberry trees was also commenced in Ohio, one of 40,000 trees near Fredericksburg, Virginia, where others were to be commenced, and five large orchards were planted in Baltimore county, Maryland. These and similar efforts throughout New England, and in other states, indicated the general enthusiasm.

Several attempts were also made to improve the winding, and other mechanism connected with the preparation and manufacture of raw silk, and several companies were organized for the manufacture of silk fabrics, generally in connection with the production of the raw material, the excitement as yet having only a healthy tendency to practical results.

Mr. Gamaliel Gay, of Poughkeepsie, New York, invented and patented this year a new mode of winding silk for the cocoons, upon spools or bobbins, instead of reels, which it superseded. He also this year received a patent for a power loom for weaving silk, which it was said to accomplish more rapidly than cotton of the same relative fineness could be woven. Both inventions were deemed valuable, especially the latter, which was introduced into establishments of the Rhode Island Silk Company, late the Valentine Company, conducted by Messrs. Dyer, at Providence, which employed a capital of $100,000, and had a cocoonery one hundred and fifty feet long, and a nursery about to be increased to 40,000 trees. Ten or twelve different fabrics of silk, and cotton and silk, woven in this establishment upon Mr. Gay's looms, were exhibited in the following March at Albany, and it was followed by the organization of a company at Troy for the manufacture of silk, and another large establishment about this time commenced operations at Poughkeepsie. The Atlantic Silk Company at Nantucket was also formed this year, to establish a manufactory of foreign and domestic raw silk, with machinery erected under the superintendance of Mr. Gay, and propelled by an engine of sixteen-horse power. The Concord Silk Company, in New

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(1) Among the publications, wholly or in part devoted to the Silk Culture at this time, were Fessenden's "New England Farmer," a weekly; Fessenden's "Silk Manual and Practical Farmer," a monthly; "The Silk Culturist and Farmer's Manual;" a monthly, edited by Judge Comstock, of Hartford, Connecticut; "The Silkworm," a monthly, by S. Blydenburgh, of Albany, commenced in May; "The Albany Cultivator," monthly, by Judge Buell; "The American Farmer," formerly edited by Gideon B. Smith, of Baltimore, a practical silk grower; "The Farmer's Register," by Edmund Ruffin, of Virginia, and several other Agricultural journals.

Hampshire, was formed in June of this year, and incorporated with a capital of $75,000, and purchased a farm of two hundred and fifty acres near Concord, for the raising of mulberry trees and silk worms. Many foreign workmen were employed in a new manufactory of silk, at Lisbon, Connecticut, under Mr. William Carpenter, a silk manufacturer from Spitalfields, and also at Mansfield, where Mr. W. Atwood, the next season, manufactured about 30,000 sticks of twist, worth $4.50 per hundred. A new incorporated company, called the Connecticut, had recently commenced at Hartford, and employed a capital of $30,000, and upward of one hundred looms, chiefly in weaving Tuscan braid, the straw being imported at a cost of about one dollar a pound. Nurseries of mulberries existed in a number of towns. Massachusetts passed this year an act to encourage the silk culture, but repealed it the next year, and gave a bounty of ten cents a pound for cocoons, and one dollar for raw silk, made in the state. The New England Silk Company, at Dedham, had commenced operations recently under the superintendence of J. H. Cobb, with a capital of $50,000. It employed sixteen sewing silk machines, and under the protective duty of forty per cent. on sewing silk, made arrangements to manufacture two hundred pounds per week. It made also, during the next year, about $10,000 worth of silk and mixed fabrics. The Massachusetts Silk Company, formed about this time at Boston, for producing and manufacturing silk, had a capital stock of $100,000, and purchased a tract of land at Farmingham, where they soon had two hundred thousand white and ten to twenty thousand Multicaulis mulberry trees growing. The Messrs. Montogul had an establishment on Washington street, Boston, which had been three or four years in operation. It constantly employed about three hundred females, and one hundred and fifty to two hundred looms in weaving Tuscan Braid in a great variety of elegant patterns. Silk formed the warp and the filling was of imported Tuscan straw with occasional admixtures of Manilla grass or fine strips of whalebone, both of which gave the braid an elegant appearance by their white and shining appearance. From eight hundred to twelve hundred bonnets were made weekly at the last mentioned factory, of a variety of beautiful forms and patterns, which sold readily in the North, South and West, at from $2.50 to $4.00 each. Much gimp was made and used in the manufacture of bonnets at the same place, by very simple but effective machinery, and a ribbon loom with a dozen spring shuttles wove a dozen ribbons at a time by a single hand. Twenty pieces of galloon were woven at the same time in another loom, by the aid of as many shuttles impelled by a single hand. From thirty to fifty pounds of silk imported from China direct or from France, at eleven dollars per pound, were used weekly in the establishment, which had also a throwing mill for making organzine and tram or warp and filling.

A variety of silk fabrics had been for several years made by Mr. Rapp, at Economy, Pa. The Beaver Silk Culture and Manufacturing Company was this year formed in Philadelphia, and purchased land to the value of thirty or forty thousand dollars near the Falls of Beaver. The Chester and Philadelphia and other silk companies were also organized in the state within a year or two, and associations were formed for similar objects in most of the states during the next five or ten years. Many of those already mentioned, and others which engaged in the silk business, were ruined by the speculation.

The value of foreign silks which were imported this year, amounted to $16,597,983, and in the following year reached the enormous sum of $25,033,200.

There were at this time only two manufactories of Hair Cloth in the United States. One of these, the first in New England, had recently been started at Deerfield, Mass., by Elias Willis. The Hair cloth used at this time was principally imported from England, and was only employed for covering furniture and making elastic stock bodies.

Six companies had at this date been incorporated by Massachusetts for the manufacture of India Rubber goods. The "Roxbury," incorporated in 1833, E. M. Chaffee and others, proprietors, had its capital increased in the last year to $300,000. The "Boston and Lynn," located at Lynn, capital $200,000; the "Boston" $100,000; the "New England" $70,000; the "South Boston" $50,000, and the "Suffolk" $150,000, were all incorporated in 1834.

The Boot Cotton Mills at Lowell, which now consist of five mills and 54,936 spindles, were incorporated. The Boston and Lowell Railroad was opened for travel in June, and the Nashua and Lowell Railroad was incorporated. A cotton factory was erected at St. Francisville, Louisiana, this year, and a paper mill in Boone County, Mississippi. A large paper mill at New Orleans made from one hundred to two hundred reams daily.

It was estimated that two million pairs of shoes were made at Lynn this year. Chocolate was made there in large quantities, amounting in the next year to one hundred tons.

The material and intellectual resources of Ohio had been greatly developed during the last five years. It now contained about one million inhabitants, and had one hundred and twenty newspapers in sixty-five different towns, thirty-two of which are still published under their original names. The first cylinder printing press in the West was purchased this year for the Methodist Book concern at Cincinnati.

The proprietors of the Cincinnati Gazette, who started this year under the editorship of J. H. Wood, the first commercial paper in the Northwest, called the "Price Current," also employed the first newspaper express ever run in the West. They obtained the President's Message from Washington in sixty hours, at a cost of $200. Cincinnati was at this time seven days distant from Pittsburg, twenty-one from New Orleans and fourteen from New York. Messrs. Corey and Webster, publishers of that city, had issued during the last three years, 771,000 volumes of school and other books, including six hundred thousand copies of Webster's Spelling Book. There were many other publishers, some of whom had probably published nearly as many. There were in successful operation in the city over fifty steam engines, besides four or five in Newport and Covington. More than one hundred steam engines, about two hundred and forty cotton gins, upward of twenty sugar mills, and twenty-two steamboats, were built in the city during this year. Its population was thirty-one thousand. The State of Ohio this year first began to export breadstuffs, wool, ashes, etc., by way of the lakes. The shipments of breadstuffs were equivalent to 543,815 bushels of wheat, and was increased in the next five years to an amount equivalent to 3,800,000 bushels.

The Newport Manufacturing Company, opposite the city, employed, during the last year, two hundred hands, and made woolen goods, cotton bagging, cotton yarn and bale rope to the value of $281,160. The manufactures of Covington for the same year were estimated at $508,500, of which value $200,000 was the product of an iron rolling mill and nail works in the town.

An official table gives the number of steamboats built on the western rivers since 1811 as 684, measuring 106,135 tons, an average of 155 tons each, of which fifty-two were built the present year. The number running on the Mississippi and twenty-two of its tributaries at the beginning of the last year was two hundred and seventy, whose tonnage was 39,000 tons. More than eight thousand miles were traveled by them. Of the whole number, three hundred and four were built in Pittsburg District (one hundred and ninety-seven in the town), two hundred and twenty-one at Cincinnati, one hundred and three at Louisville, nineteen at Nashville, and thirty-seven at other places. The arrivals of steamboats at New Orleans this year were estimated at twenty-three hundred, an increase of seven hundred since 1832.

The "Howe Manufacturing Company" was established in December of this year, at New York, by John J. Howe and his associates, for the manufacture of "Spun Head" Pins under Mr. Howe's patent. They established a manufactory at Derby, Connecticut; and some five years after, having obtained a new patent for "solid-headed" pins, Mr. Howe commenced the manufacture of them. Mr. Samuel Slocum, of Rhode Island, obtained a patent in England this year, for his machine for making solid-headed pins, since extensively used at Poughkeepsie, New York, and Waterbury, Connecticut.

Several experiments were made during the past and present years, by the late Walter Hunt of New York, to produce a Sewing Machine. Notwithstanding many ingenious devices, it was never perfected so as to be patentable, and was laid aside until after the invention of a practical machine by Elias Howe, in 1845, when claims were made on Hunt's behalf to the original invention.[1]

The manufacture of Locomotives was commenced in New York by Thomas Rodgers, an eminent manufacturer of cotton machinery, railroad work, etc. Fourteen locomotives were built this year in Philadelphia, by M. W. Baldwin, and about forty the next year. The Norris Locomotive Works in the same city were also in operation on a smaller scale, and about this time turned out the engine "George Washington," which, on the 10th July, 1836, ascended the inclined plain, on the Columbia and Philadelphia railroad, thereby demonstrating the fact that heavy grades could be ascended without the aid of stationary engines and ropes. This resulted in a new principle of construction for railroads and great saving of expense in grading. It established the reputation of the builder, who added other improvements the same year, and became known in Europe and America as a skillful constructor.

Nearly one hundred thousand wood and brass clocks were made this year in the towns of Bristol, Plymouth, and Farmington, Connecticut. Many women were employed, chiefly in making and painting the dial-plates.

PATENTS.—Artemas L. Brooks, Lowell, Mass., Jan. 7, improvement on Woodworth's Planing Machine. It made use of two revolving cutters for planing both sides of a board at once, instead of one as in Woodworth's machine, in the patent of which he owned a right. Peregrine Williamson, New York, March 30, manufacture of metallic or steel pens—an improvement upon his pen patented in 1809—Charles Jackson, S. S. Potter and John Miller, Providence, R. I., April 2, combined rotary and stationary spindle for spinning. C. Whipple, J. Sprague, and M. D. Whipple, Douglas, Mass., April 3, lathe for turning lasts and other irregular forms.—This patent was assigned to Carter & Hender of Boston, principal owners of Blanchard's earlier

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(1) Gifford's Argument on Howe's Application for Renewal of Patent.

patent for the same purpose, from which this differed somewhat. S. S. Allen, Saratoga Springs, N.Y., and John Brandon, Williamsport, Pa., April 8, each a portable horse power. [In both these horse powers the animal walked around the machine.] Lemuel Hedge, Brattleborough, Vt., April 22, constructers of the joints of carpenters' rules; Henry Blynn, Newark, Essex Co., N. J., May 9, machine for stiffening hat bodies. [This mode of stiffening by immersing the crown and brim in stiffening liquors of different strength and passing between rollers, was an improvement which enabled one man to do the work of five by the old process, and is still in use.] Lucilius H. Mosely, Poughkeepsie, N. Y., May 9, throwing and twisting silk; Gamaliel Gay, Poughkeepsie, N. Y., Aug. 17, unwinding silk upon spools instead of reels; to the same, Sep. 26, a power loom for weaving silks; P. M. Gilroy, Warwick, and Abner S. Tompkins, North Providence, R. I., May 9, improvement in the damask loom by the application of water or other power to drive it; Elwood Mears, Philadelphia, June 26, ever pointed lead pencils; Guy C. Baldwin, Ticonderoga, N. Y., Dec., making pencil points and composition therefor; Dayton, Hoyt & White, Salina, N. Y., June 6, and John White, New York, July 18, making coffins from hydraulic cement, and to John White, July 18, for coffins of artificial stone or marble; Preswick and Fisher, New York, Aug. 17, preparation of oil of hazel; Amasa Stone, Johnston, R. I., Aug. 17, power loom and taking up motion. This improvement upon a former patent was introduced by the patentee into England, and was considered a valuable mechanism. Jesse Marden, Baltimore, Md., Sep. 9, balance platform scale for weighing—a useful invention still in demand; Charles Goodyear, New Haven, Ct., Sep. 9, gum elastic cement. Four other patents were granted for making and using hydraulic and other cements. J. S. Brown and J. J. Barker, also to W. Bradly and M. L. Worthley, all of Philips, Me., Oct. 14, for machines for cutting felloes for wheels; William Gates, Hanover, N. Y., Nov. 14, for Japan applied to leather; John Scott, Philadelphia, Nov. 26, use and application of asbestos to stoves, grates, crucibles, etc.; F. Goodwell and F. H. Harvey, Ramapo, N. Y., Dec. 2, power loom for weaving stock frames; Joseph Curtis, New York, Dec. 28, three patents for an amalgam mill for separating gold from ore.

An act of Congress of March 3 authorized letters patent to Francis B. Ogden, for "an engine for producing motive power whereby a greater quantity of power is obtained by a given quantity of fuel than heretofore," as the assignee of John Ericsson, "a subject of the King of Sweden," the true inventor, whose improvements in steam propulsion have since excited much attention.

A Report on the cultivation, manufacture, and foreign trade of cotton, accompanied by a series of tables, giving its statistics since the year 1836 1789, was communicated to Congress on the 4th of March, by the Hon. Levi Woodbury, Secretary of the Treasury. The capital invested in the production of cotton was estimated at eight hundred millions of dollars, and the average production of the last ten years was 2,137,000 bales. The foreign trade in raw cotton of the whole world, which was small compared with the whole growth and consumption, did not probably exceed five hundred and thirty-five millions of pounds, and of that the United States exported about three hundred and eighty-four millions of pounds, or almost three-fourths. The average price of Upland cotton, at the place of exportation in the United States, during the last year, was sixteen and a half cents, and in England twelve and a half pence sterling—sea Island cotton being usually worth two hundred and fifty per cent. more than other kinds. Of the exports in the last year 253,000,000 pounds went to England, 100,333,000 to France, and 16,750,000 to other places, of which Holland and Belgium, Trieste, and the Hanse Towns, were the principal.[1] The quantity of raw cotton manufactured in England, during the last year, was about 320,250,000, and in the United States about 100,000,000 of pounds. The capital employed in manufacturing, by machinery, amounted in England to $185,000,000, and in the United States to $80,000,000, the value of the product in the latter being forty-five to fifty millions of dollars. The spindles employed in cotton manufactures in the United States, were estimated at 1,750,000. The value of the exports of cotton goods from England, in 1835, was placed at $88,500,000, and in the United States, in 1834, at $2,200,000. The exports of cotton manufactures from England had been for some years, and were now, nearly equal to one half of her exports of every kind; and in 1834 about one third of the value was in yarn, which in some years constituted one half the weight.

The best cotton goods were supposed to be made in Switzerland, where the skill and machinery were good, and the climate congenial. But the raw material, being carried so far by land, was expensive, and

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(1) The value of raw cotton exported this year (1836), from the United States, amounted to 423,631,367 pounds, valued at $71,284,925. The value of cotton manufactures imported was $17,876,087, of which $14,092,477 were from Great Britain, and $2,321,008 from France, whereof $2,765,676 were re-exported chiefly to Mexico, Cuba, and South America. The exports of domestic cotton goods this year were valued at $2,255,734, chiefly to Cuba, South America, and Africa. Cotton bagging, worth $1,701,451, was exported this year, nearly all of it from Great Britain, and the Hanse towns.

the manufacturer could not compete with England, though twenty per cent. cheaper than in France.

In France many fine goods were made by skill and experience, but the machinery was poorer and cost more. Hence the prices in those two countries of the cloth made from a pound of raw cotton exceeded on an average fifty cents, while in England they were about fifty cents, and in the United States were now somewhat less. We made more coarse and substantial cloths of cotton than England, and they could be afforded cheaper by two or three cents per yard. They were in greater demand abroad, as we put more staple into them, the raw material being cheaper here. But the English laces being made chiefly of Sea Island cotton, with a very little silk, enhanced the value of each pound to over five dollars; and the whole manufacture of it equalled $9,000,000 per annum, or 30,750,000 square yards.

In regard to improvements in machinery, it was remarked that a spindle now sometimes revolved eight thousand times in a minute instead of only fifty times as formerly, and would spin on an average from one sixth to one third more than it did twenty years previous. Indeed, in 1834, it was said that one person could spin more than double the weight of yarn in a given time than he could in 1829. The quantity of raw cotton spun by one spindle depended of course on the fineness of the thread, and the quality of the machinery. In England, where a considerable portion of the yarn was finer, the average was about eight and a half ounces weekly, or from twenty-seven to twenty-eight pounds yearly; while the average in the United States was about fifty pounds yearly, of yarn number twenty and twenty-five in fineness, and about twenty-six pounds of number thirty-five and forty. In 1808, the average was computed at forty-five pounds per spindle of cotton, yielding thirty-eight pounds of yarn. The loss from dirt and waste was estimated at from one twelfth to one eighth. At Lowell one hundred pounds of cotton yielded eighty-nine pounds of cloth, though the average here used to be estimated at only eighty-five pounds, when cotton was not so well cleaned, and machinery less perfect. One spindle at Lowell produced, through looms, etc., on an average one and one tenth yards of cloth daily, but this result differed greatly with the fineness of the thread, excellence of the looms, width of the cloth, etc.

In 1830, it was computed that thirty-seven spindles were necessary to supply one loom; though in 1827, at Lowell, the actual proportion was only twenty-six; at Exeter, in 1831, it was twenty-nine, and now at Lowell it is eighteen hundred and thirty-one. The number of looms in England, in 1832, was only one to about forty spindles, (so much more yarn is made and not woven there,) and these were mostly hand looms.

But in 1834, the number of them was about one hundred thousand power looms, and two hundred and fifty thousand hand looms, or in all, about one to thirty. One loom formerly wove about twenty yards of cloth of the ordinary seven eighths width, more of the twenty-six inches in width used for calicoes, and less of the five quarter wide. The average new was from thirty to forty yards of number twenty. At Lowell, in 1835, it was thirty-eight to forty yards of number fourteen and twenty to thirty yards of number thirty. It required from four to five yards of number twenty to twenty-five yarn to weigh one pound, and five to six yards of numbers thirty-five to forty.

In making cloth of plain ordinary width and fineness, one person was needed to conduct all the business from the raw cotton to the finishing of the cloth for every twenty spindles. If the cloth was colored, printed, or stamped, one person was required for every seven spindles. This would be about two hundred and fifty persons for all purposes in a factory of five thousand spindles, making plain thin cloth. One person could manage from two to three power looms.

The average number of spindles in new mills was now five to six thousand. In Lowell, in 1836, they had in twenty-seven mills one hundred and twenty-nine thousand eight hundred and twenty-eight spindles, or a little under five thousand to each, though they printed, etc., in some. A factory with five thousand must be about one hundred and fifty-five feet long and forty-five wide, four stories in height, and contain about one hundred and forty looms with other suitable machinery for picking, working, and sizing. Such an one would cost, with a few shops and outhouses appurtenant, and land and water privilege, $140,000 to $220,000, according to the materials for building, distance from navigation, etc. If bleaching or printing cloths be added, more expense would be necessary, and more than two hundred and fifty persons, making a permanent investment in buildings, water power, machinery and appurtenances, equal to twenty-eight or forty-four dollars per spindle, independent of temporary investments in raw material and wages.

Spindles, which were about half the expense of all the machinery, formerly cost in France ten dollars, and in 1832 eight dollars each, now cost here four dollars and a half if of the throstle kind, and two dollars and a half if of the mule kind; but in some places in the United States five per cent. higher. Throstles in 1826 cost here, it was said, eight dollars each. The spindle used in the filling frame quite extensively at this time, cost about six dollars.

About forty-two and a third pounds of flour were used to each spindle per annum, for sizing, or four pounds weekly to each loom; in England and here about one pound weekly to each loom, but at Lowell nearly four pounds each per week. In England three times as many spindles and factories were moved by steam as by water. In the United States not one in a hundred factories was moved by steam. The power to move all the cotton mills in England equalled that of forty-four thousand horses, of which only eleven thousand was by water wheel. In 1824 the whole power was estimated at only 10,572 horses. Each factory of common size and employment required from sixty to eighty horse power here or about eleven and a half horse power to one thousand spindles.

On the fourth of July an "act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose" was approved, and became substantially the foundation of the present system of protection to inventors and discoverers in the United States. By this law, which has been amended by several subsequent acts[1] regulating the details of organization and business, the Patent Office was entirely reorganized and erected into a separate bureau or department of state with enlarged powers, under a chief to be called the Commissioner of Patents,[2] to be appointed by the President of the United States, with a chief clerk, examiner, and three subordinate clerks. Patents were to be issued under a special seal of the office, and to be signed by the Secretary of State and countersigned by the commissioner. Among other provisions of the act, the examiners, instead of merely making, as formerly, a comparison of the specifications, drawings and model, to ascertain their agreement, were required to entertain the question of novelty, utility and priority of invention, in aid of which increased labors a library of scientific works and periodicals was provided. Models and specimens of manufactures, works of art, etc., whether patented or unpatented, were to be arranged and classified in suitable rooms or galleries, and to be open at suitable hours for public inspection. The first commissioner was Hon. Henry L. Ellsworth, appointed July 4 of this year.

On the 15th December the Patent Office with all its contents, occupying a part of the General Post Office building, was destroyed by fire, obliterating the records and models which had accumulated during many years.

The Trustees of the American Institute in New York on the 30th March, issued a circular to the friends of the useful arts and national industry announcing the establishment of a Repository of Arts of the

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(1) Subsequent acts were approved March 3, 1837, March 3, 1839, August 29, 1842, May 27, 1848, and March 4, 1861.

(2) The chief of the Patent Office in 1821, received by courtesy, the title of Superintendent, and the incumbents of that office were William Thornton, appointed July 1, 1821, Thomas B. Jones, April 12, 1828, John D. Craig, —— and J. C. Picket, Jan. 31, 1835.

American Institute, at No. 187 Broadway, to be opened in May. It was intended to collect into one great hall, machines, models, specimens and drawings of all the important improvements and inventions which the country afforded, and for that purpose manufacturers, mechanics, artizans, inventors and producers generally throughout the country were invited to contribute their varied products. A library was opened to the public, and a monthly journal of the proceedings of the institute was published at the Repository. They also commenced the publication of an annual volume of the transactions, continued to the present time.

A law was enacted in Massachusetts prohibiting, under penalty of fifty dollars, the employment of any child under fifteen years of age, in any manufacturing establishment, unless such child had received school instructions under a legally qualified teacher, in orthography, reading, writing, English grammar, geography, arithmetic, and good behavior, for at least one term of eleven weeks in the year preceding its employment, and for the same period during any and every twelve months in which the child was so employed.

Charters were this year granted in Massachusetts to seventy-three manufacturing corporations, with an aggregate capital of $10,729, in addition to thirteen railroad companies with $5,675,000 capital, and twenty-eight companies for other purposes representing $6,172,500 capital—total $22,576,500.

The Legislature of Pennsylvania passed on 16th June, an "Act to encourage the manufacture of Iron with coke or mineral coal, and for other purposes." It authorized the formation—with the usual corporate privileges—of associations with capitals of not less than $100,000 nor more than $500,000, in shares of fifty dollars each, exclusively for the manufacture, transportation and sale of iron made with coke or mineral coal, each corporation to hold two thousand acres of land and to make an annual statement of its transactions to the Legislature.

The first manufacture of Wrought Iron Tubes and fittings for gas, steam and water works in the United States, was commenced this year at the Pascal Iron Works, Philadelphia, by Morris, Tasker & Morris. The senior member of the firm had carried on, for fifteen years previously, the manufacture of coal grates, stoves, and general smith-work, and they afterward added to their business the making of cast-iron gas and water mains, lapwelded flues for boilers, gas and steam fitters' tools, etc., employing machinery of a very perfect description, in which they now consume over six thousand tons of anthracite fuel annually.

A Geological Survey of the State of Virginia, by Prof. W. B. Rogers, was commenced under an act of the last year, and was completed in six annual reports. State geological surveys of Pennsylvania and New

Jersey were ordered by their respective legislatures, to be conducted under the direction of Prof. Henry D. Rogers, now of the University of Glasgow. The first report of New Jersey was made this year, and the final one in 1840. Several annual reports of the Pennsylvania survey were made, and in 1859 Professor Rogers published in Edinburg, in two quarto volumes, accompanied by maps and illustrations in the highest style of accuracy and beauty, his final report on the Geology of Pennsylvania. Professors Emmons, Matthew L. Vanuxem, L. C. Beck, T. A. Conrad, and James Hall, were appointed by the State of New York to make a geological survey of that state. Five annual reports were made, and have been followed by several volumes of a final report, embracing the Natural History of the state in general and a geological map.

J. R. Cotting was this year commissioned to make a state survey of Georgia, which appeared in 1841. D. Trimble reported on the Geology of Kentucky during this year.

One of the most extensive Copper Mines in the country was opened about this time at Bristol, Connecticut, which yielded the proprietors, for many years, large quantities of ore containing thirty-two per cent. of copper. In Flemington, New Jersey, was a copper mine lately opened, which was the only one in that state that was wrought at this time.

The productive value of all branches of manufactures, including raw material, in the city of Pittsburg, was estimated this year at $15,575,440, the largest items being $4,160,000, the products of nine rolling mills in operation, and $2,130,000, produced by eighteen iron foundries, steam engine factories, and machine shops—six cotton factories produced about $500,000 worth of goods. Sixty-one steamboats, valued at $960,000, were built there this year. Messrs. Lippincott & Brothers, and Kings, Highby & Anderson, manufactured eight thousand dozen shovels and spades, one thousand six hundred dozen hoes, and six hundred dozen saws. Owen Waters, on Chartier's creek, and E. Estep, at Lawrenceville, made axes, shovels, and spades, etc., to the value of $90,000. The manufactures and mechanical products and sales of all kinds, foreign and domestic, were estimated at from twenty to twenty-five millions of dollars. Nine million feet of lumber from the Alleghany were measured in the last year, and over seven million feet this year. The whole quantity of lumber sent down the Ohio from the Alleghany, was computed to be thirty million feet.[1]

In the city of Wheeling, Virginia, were one hundred and thirty-six establishments for the manufacture of domestic goods, employing more

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(1) Syford's Western Address Directory, pp. 92–112.

than seventeen hundred hands and twenty-eight steam engines, equal to nine hundred horse power. Their annual product was worth at least two million dollars. Within a circle of twenty-five miles were one hundred and thirty-four flour mills, making at least two hundred and eighty thousand barrels of flour, worth $6.75 per barrel. Eleven steamboats valued at $198,000, were built there during this year. Coal cost there in no case over three cents a bushel, and in the rolling mill and nail works of D. Agnew & Co., cost only one and a half cents a bushel.

Dayton, Ohio, contained within its corporate limits water power sufficient for thirty-five pairs of mill-stones, or seventeen thousand five hundred cotton spindles; and improvements were contemplated which would increase it fourfold, by making nearly the whole power of Mad river available. The capital employed in trade and manufactures exceeded one million dollars. The principal factories were three or more cotton mills, two gun barrel factories, the Dayton Carpet Factory incorporated and recently put in operation, an extensive machine shop, flouring mill with three run of stones, carding and fulling mill, clock factory, last factory, iron foundry in operation six years, two soap and candle factories, etc. During this year eighty-one houses were built and nearly three millions of bricks were laid.

A Cotton Factory capable of running one thousand spindles was put in operation on the 4th July, at Fayetteville, North Carolina. Two cotton mills three stories high, with machine shop and sizing house, had been recently erected on the Appomatox, four miles from Petersburg, Virginia. They would contain about four thousand spindles and one hundred and seventy looms. The silk business was about to be commenced at Petersburg. Among the numerous companies chartered this year in Massachusetts, was the Perkins Mills, at Chicopee, with a capital of $400,000, afterward increased to half a million.

The Hudson Calico Print Works of Marshall, Carville & Taylor, was in a high state of efficiency, having forty-two block hand printers and five printing machines, two of which printed four colors at a time, and three of them three colors. The machines were all of the best models in England, whence they had been recently imported, and could print eighteen thousand yards or 5,400,000 yards per annum. Mr. Benjamin Marshall, of Troy, at this time proprietor of the New York Mills, made the finest shirtings in the country as well as the finest printing cloths.

The quantity of calicoes printed in the United States during the year ending April 1, was one hundred and twenty millions of yards. There were several establishments in the country for printing silks and ginghams, of which the Phillips Mills, at Lynn, Massachusetts, was probably the largest.

Silk Societies and Stock Companies continued to be formed and incorporated in different parts of the country. Additional interest in the subject was excited by a communication from General Tallmadge—then on a tour through the silk countries of Europe—which appeared in the Journal of the American Institute. In Massachusetts a legislative bounty of ten cents a pound for cocoons, and one dollar for raw silk made in the state, was offered April 11th, but only $85.20 was claimed during the year. Maine offered bounties of five cents for cocoons and fifty cents for raw silk, and New Jersey fifteen cents a pound for cocoons raised in the state for five years. The latter act excepted "bodies corporate and politic," and was repealed the next year.

The general prosperity of the country was indicated by the importation during this year, of silks—chiefly manufactured goods—to the value of twenty-two millions of dollars or more than double the average of former years. The total importations of the year amounted to one hundred and fifty-nine millions, and averaged for the last three years one hundred and twenty-two millions per annum, against an average of seventy millions annually for the five years under the tariff of 1828.

A large Ingrain Carpet Factory, afterward Petton's, was established this year at Poughkeepsie, New York, by Henry Winfield, which, four years after, turned out, of three-ply, superfine, fine and common ingrain carpeting, plain and twilled Venetian stair carpets, one hundred thousand yards, and one million yards of carpet bindings, of excellent quality, per annum, and employed seventy men.

The celebrated Eagle Brewery of M. Vassar & Co., was also erected at Poughkeepsie. Twelve years after it covered thirty-five thousand square feet of ground, and made annually twenty thousand barrels of ale, beer, and porter, worth $100,000.

The India Rubber Factory at Troy, New York, having been burned about this time, a new company was immediately formed and a new factory was put in operation, in which one hundred and twenty persons were employed, making daily one hundred pairs of shoes, besides garments and other articles.

The first Coinage by steam power in the United States Mint was done on the 23d March, with a new Coining Press designed by Franklin Peale, and a medal was struck in commemoration of the event. An improved milling machine, invented and introduced at the same time into the United States Mint by Mr. Peale, was also carried by steam.[1]

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(1) This coining press, which was a very perfect piece of mechanism, was made with a toggle joint, a contrivance which was not claimed by Mr. Peale as altogether new, as coins had been struck in Europe by such machines many years before, and Mr. M.

Similar machines and presses for cutting out blanks or Planchets for coins were, like those above mentioned, constructed under Mr. Peale's direction, by Messrs. Merrick and Agnew of Philadelphia, for the use of the branch mints at Charlotte and Dahlonega, which, with a third at New Orleans, were created by act of Congress in the last year. A Code of Mint Laws was enacted in January of the next year.

PATENTS.—George B. Dexter, Boston, Jan. 6, water-proof silk hats; Isaac Orr, Washington, D. C., Jan. 20, air-tight stoves. [This patent gave rise to several suits at law, in which the originality of Dr. Orr's invention was disputed; after he had, during several years, received considerable sums from its manufacture, an injunction was granted and sustained against infringements.] Edwin Gordon, Hingham, Mass., Feb. 17, cannon for chain shot; Wm. H. Bell, Washington, D. C., May 14, cannon traverse board for pointing cannon. [By an act of Congress of July 4, this patent and another granted to Mr. Bell in the last year, for elevating cannon, were purchased for the United States government for the sum of $20,000.] Isaac Schnaïtmann, Philadelphia, Feb. 20, glasses for spectacles; Samuel Colt, Hartford, Conn., Feb. 25. [This patent of Col. Colt, recently deceased, was for the celebrated revolving fire arms, the idea of which is said to have occurred to him at an early age, and while on a voyage to India at the age of fifteen, a model was made which is still preserved. Having secured patents in the United States and Europe, he formed, about this time, a company at Patterson, N. J., with a capital of $300,000, for the manufacture of pistols and carbines, which proved unsuccessful and failed. In 1848, during the Mexican war, he resumed the manufacture under a contract with the government, at Whitneyville, Conn., and the next year removed to Hartford, where, in 1850, he projected the immense establishment in which the manufacture has since been conducted. He died January 10, 1862.] Benjamin F. Boyden, Boston, March 31, cast-iron hoe; James A. Gray, Richmond, Va., June 11, metallic coffins; Thomas Blanchard, New York, Aug. 1 to 31, nine several patents for ships' blocks and processes connected with their manufacture; Arnold Wilkinson, Providence, R. I., Aug. 31, polishing iron and brass wire for weavers' reeds. [This included the use of steam power in place of the tedious hand process, of preparing wire for reeds, by the successor of Jeptha A. Wilkinson, the inventor of the reed-making machine, and who made other improvements in the business still carried on by Mr. Frederick Miller.] Isaiah Jennings,

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W. Baldwin of Philadelphia, had several years before commenced the construction of a coining press on that principle. Steam power was also used at this time at the Royal Mint in London, and its operation was regarded with great curiosity.—*Franklin Journal, vols.* 22 *and* 23.

New York, Sep. 22, two patents (one being a reissue) for lamps for burning his patent composed of alcohol and spirits of turpentine; J. Arnold and G. G. Bishop, Norwalk, Conn., Oct. 20, forming a web of wool, hair, etc., without spinning; Alonzo D. Phillips, Springfield, Mass., Oct. 24, friction matches—being the first American patent for matches, the constituents of which were chalk, phosphorus, glue and brimstone.—William Woodworth, New York, Nov. 15, planing machine —first patented in 1828.

On the 25th February Mr. Adams, from the Congressional Committee on Manufactures, to whom had been referred a resolution of the House
1837 in the last session, instructing them to inquire into the expediency of promoting the Culture and Manufacture of Silk, communicated a full report on the subject. Much of the information was contained in a letter from Mr. Andrew Judson of Connecticut, a late member of Congress, to whom had been delegated the duty of making the necessary inquiries. He stated that it had been found perfectly practicable to raise mulberries and silkworms throughout the whole of the United States. The Morus Multicaulis could be acclimated in the Northern and Middle States, and upon one acre of land would sustain sufficient worms to raise one hundred and twenty-eight pounds of silk, then worth $640. The process of reeling silk had been found an easy acquisition and was adapted to the labor of the young and the aged. The manufacture of silk was as simple as that of cotton or wool, and far less expensive in buildings and machinery. The weaving of silk fabrics on power looms had been successfully attempted—gentlemen's wear, cravats, etc., having been woven of a texture little if any inferior to the foreign. In this respect we were already in advance of the manufacturers of Europe and of India. This country, it was certain, could successfully compete with others in the culture and manufacture of silk. The importance of these branches of economy both in a pecuniary and moral point of view was immense. The six New England States were more or less engaged in the culture and manufacture of silk, and four of them were encouraging the business by legislative bounties, which New York was also about to do. Silk companies existed in all the Eastern and Middle States, and in the Southern States much interest was felt in the subject. It was proposed in Virginia to devote the worn out tobacco lands to the culture of silk, in order to arrest the emigration which was setting westward and threatened to depopulate the state. The Western States were peculiarly adapted to the business, and a number of companies with large capitals were incorporated in Ohio, and under skillful managers. Seventy families in the vicinity of Canton, in

Stark county, were engaged in making silk, and many were beginning in several other counties. It was commenced in Kentucky about a year and a half ago. In Indiana, Illinois, Missouri, and Tennessee, beginnings had been made.

By an act of Congress, approved March 1, the tenth and twelfth clauses—relating to various articles of hardware, japanned, plated and other metallic wares—of the second section of the act of July 14, 1832, were suspended until the close of the next session.

"An act in addition to the act to promote the progress of Science and Useful Arts," dated March 3, enacted that all patents, grants or assignments made previous to the destruction of the Patent Office on 15th December, should be recorded anew, when the applicant had deposited in the Patent Office a duplicate as near as might be of the original model, drawings and descriptions, etc., verified by oath, and that such records and copies only should be valid evidences of title. The Commissioner was required to obtain duplicates of such of the models destroyed by fire as were most valuable and interesting to the public, for which purpose $100,000 were appropriated, and agents authorized in twenty different towns. An additional examining clerk and temporary clerks were to be appointed, and the commissioner was required to lay before Congress an annual report, embracing a classified list of all patents granted during the preceding year, with the names and residences of patentees, and a list of expired patents and account of expenditures.

On the 15th September a Standing Committee on Patents was instituted by Congress.

The Secretary of the Treasury on the 10th March, issued a circular requesting information in regard to the propriety of establishing a system of Telegraphs in the United States. In reply, Professor Samuel F. B. Morse, of New Haven, communicated an account of his invention of an electro-magnetic telegraph, and of its proposed advantages and probable expense. By its use he "presumed five words could be transmitted in a minute." The result of his numerous experiments was made public in April, and his first caveat for the "American Electro-Magnetic Telegraph" was entered in October. Having petitioned Congress for aid to make a practical test of his invention, $30,000 were afterward granted, and the first line was erected in June, 1844, between Washington and Baltimore.[1]

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(1) The Electro-Magnetic Telegraph of Cook was patented in England, in June of this year (1837), and in July, Steinheil put in operation, between Munich and Bogenhausen, his registered electro-magnetic telegraph, producing dots and marks to stand for letters on fillets or ribands of paper, moved forward by clock work.

A report and statistical tables, prepared by John P. Bigelow, Esq., Secretary of the Commonwealth of Massachusetts, from the returns of the assessors in each county, made for the first time under a recent act of the Legislature, for obtaining "statistical information in relation to certain branches of industry within the Commonwealth," exhibits the following general results of manufacturing and mechanical labor during the year ending April 1st, including the fisheries and all vessels built in the five years preceding, viz.:

Total value of Manufactures $91,765,215 (or averaging the shipbuilding) $86,282,616, whole number of hands employed 117,352; capital invested $54,851,643. The principal branches were boots and shoes, of which the value was $14,642,520; manufactures of cotton $17,409,001; of woolen goods $10,399,807; of leather, including morocco, $3,254,416; whale, cod and mackerel fishing $7,592,290; vessels built in five years $6,853,248. The manufacture of cotton goods (cloth), exclusive of printing, employed mills 282; spindles 565,031; male hands 4,997; female hands 14,757; capital invested $14,369,719; cotton consumed 37,275,917 pounds; annual product 126,319,221 yards of cloth, worth $13,056,659. The woolen manufacture employed 192 mills and 501 sets of woolen machinery, 3,612 male and 3,485 female hands; capital $5,770,750; and consumed 10,858,988 pounds of wool and 236,475 gallons of sperm oil, producing 11,313,426 yards of cloth valued at $10,399,807. The number of Saxony sheep in the state was 46,985, and of Merinos 200,383, all others 127,246. The total population was 701,331.

In consequence of the excessive importations of foreign merchandise in the last three years, under the Compromise Act, amounting in 1836 to $189,980,035, (an increase of $63,458,703 over those of 1834, the first year of its operation, and averaging for the three years $155,465,703 per annum,) a large amount of capital was driven from manufactures to seek investment in agriculture and in western lands. The revenue from customs and from the sale of the public domain had enabled the government at the commencement of the year 1835, to announce the total extinguishment of the public debt; and at the close of the ensuing year left in the Treasury, from the same sources, a surplus of over forty millions of dollars, the greater portion of which was derived from the Land Offices. A removal of the deposits was determined upon by the government, and twenty-eight millions of the surplus revenue was deposited in the state banks. It was liberally loaned to merchants and land-jobbers whose operations tended to swell the receipts. The circulation and discounts of the banks had also, in the last three years, increased over fifty per cent. in consequence of the spirit of speculation, and the abuse, and of credit was but feebly checked by the "specie circular" of the government requiring the value of public lands to be paid in coin. A commercial revulsion, such as the country had seldom witnessed, resulted from these and other causes. It commenced on the 10th May, by the suspension of the New York banks, a measure which soon became general throughout the Union. A decline of over forty-eight millions in the value of the imports—which still amounted to nearly one hundred and forty-one millions, or twenty-three and a half millions in excess of the exports—and of more than twelve and a half millions in the revenue from customs, soon compelled the National Treasury to borrow money. The financial troubles which ensued were not alleviated for several years, notwithstanding various general and local measures of relief, including a Bankrupt Law which obliterated many millions of indebtedness. Numerous factories, particularly in New England, were compelled entirely to suspend business to the great distress of their operatives, and the government was at length compelled to return to a system of higher duties and of protection to domestic industry.

Reports, partial or complete, were made this year of several State Geological Surveys, leading to better knowledge of the natural resources of the country, viz.: of Maine by Dr. C. T. Jackson; of Connecticut by Prof. C. U. Shepard; of Delaware by Prof. J. C. Booth; of Ohio by Dr. Hildreth, Professors Locke and Briggs, and Mr. J. W. Foster; and of Indiana by Dr. D. D. Owen.

Experiments in Smelting Iron with Anthracite Coal were begun this year, and successfully accomplished, it is said, by Baughman, Ginteau & Co., of Mauch Chunk, Pennsylvania.

The consumption of Anthracite Coal in the United States, or the trade in it, amounted this year to 881,026 tons, an increase of 1,735 per cent. in ten years.

The quantity of Sole Leather inspected in New York this year was 665,000 sides, an increase of 150 per cent. in ten years.

Salt to the amount of 2,161,288 bushels was inspected in the State of New York.

The number of Vessels built in the United States during this year was 949, and their tonnage was 122,987,022.

On the 28th May the American packet ship Toronto, of 630 tons, was towed out of the Thames against the tide at the rate of four and a half knots an hour, by the experimental steamboat "Francis B. Ogden," built by Captain John Ericsson, now of New York, and fitted with the patent propelling apparatus of his invention, which has since been so extensively adopted in ocean steamships. Captain R. F. Stockton of the United States Navy, who witnessed the performance, ordered two iron steamboats to be built upon the same principle for the United

States, whither Mr. Ericsson removed at his invitation in 1839, and built the propeller Princeton, for the government, to test the value of the new mode of propulsion.[1]

In Massachusetts seventy-six furnaces were in operation for casting iron, and produced articles to the value of $1,205,840. The sand for moulds was nearly all obtained out of New England.

The manufacture of Machinists' Tools was commenced at Nashua, New Hampshire, by John H. Gage, whose establishment was probably the first in the United States devoted exclusively to that business, which is still, with other branches, conducted on a large scale by Gage, Warner & Whitney.

One of the most complete Wire Manufactories in the country was that of Townsend, Beard & Co., at Fallstown, Beaver county, Pennsylvania, which supplied the valley of the Mississippi with wire. The place contained, in addition to sawing, flour, oil, paper and woolen mills, sash, chair and other factories, a Bucket factory which made thirty thousand buckets annually. Wickersham's Wire Works at Pittsburg, also worked up about six hundred tons of Juniata iron yearly.

Pressed Glass Tumblers and other drinking vessels were first made at this time, the process of making pressed glass being an American invention.

Covered Coat Buttons were extensively manufactured for Mr. Samuel Williston, by J. and J. Hayden, at Haydenville, in Hampshire county, Massachusetts. The factory employed about two hundred girls, and produced daily upward of one thousand gross, from the most simple kinds to the most elegant satin figured buttons. The Williston metallic flexible shank button, patented in 1831, passed through fifteen different hands in the process, the several operations being performed by ingenious machinery invented by the proprietors, who also made iron or pea-jacket buttons by automatic machinery.

There were at this date four Cotton Mills in North Carolina, viz.: at Greensborough, Mocksville, Haw river and Cane Creek. Two or three spinning factories of one hundred to two hundred spindles, each carried by animal power, were in operation in Illinois, producing cotton yarn successfully from material grown in the state. Much cloth was also

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(1) The Ogden was named after F. B. Ogden, Esq., for many years American Consul at Liverpool, who had been connected with the first steam navigation on the western rivers and on the ocean; eminent for his attainments in mechanical science, which enabled him to understand and appreciate the merits of Mr. Ericsson's invention, though disregarded and opposed by British engineers and the British Admiralty. Mr. Ogden joined the inventor in constructing the boat, and among other services originated the idea of right angular cramps in marine engines.—*See Atlantic Monthly for July*, 1862.

made in the families of emigrants from states south of Ohio, who employed the cotton produced in the country. Companies had been incorporated in that state within four or five years, for various manufacturing purposes, some of which had commenced operations.

Charters were granted in New York State to the following companies, viz: to the Penn-Yan Manufacturing Company, for twenty-one years, for manufacturing cotton and woolen goods and India Rubber water-proof cloth, or either of them separately—capital $200,000; the Ulster Cotton and Woolen Manufacturing Company, with a capital of $300,000, to be located at the Great Falls of Esopus, in Saugerties; to the Rossie Galena Company and the Rossie Lead Manufacturing Company, each with a capital of $24,000, for raising and separating lead from the "Coal Hill Mine," near the village of Russia, in St. Lawrence county. This rich vein of lead ore opened in 1835, in the azoic gneissoid rocks of St. Lawrence county, was three to four feet wide, and the solid ore averaged ten inches wide. It was worked by the two companies in sections, but with little knowledge of mining operations; the ore being smelted by Moss & Knapp for twenty-five dollars per ton of lead obtained. It was abandoned in 1839 on account of foreign competition, after about 3,250,691 lbs. of lead, worth $241,000, had been sold; but mining was resumed in 1852 by the Northern Lead Company. The West Carthage Iron and Lead Company, in the town of Champion, in Jefferson county, was also incorporated about the same time, with a capital of $200,000, to manufacture iron and lead.[1]

The Troy Academy was revived by an act of the Legislature, and incorporated with the Rensselaer Institute; the latter to be denominated the "Department of Experimental Science," the other the "Department of Classical Literature."

PATENTS.—During this and the three years preceding upward of one hundred patents were granted for improvements in cooking stoves, exclusive of cooking grates, ranges and other stoves. Allen Pollock, Boston, patented March 3, a register and air-box for grates, etc.; Elijah Jaquith, Brattleboro, Vt., March 11, Heber Chase, M. D., Philadelphia, June 10, R. Salisbury, Providence, R. I., Nov. 4, and J. Hungerfield, Dover, N. H., Dec. 26, each a patent for truss for hernia; Henry A. Wells, J. James and R. W. Peck, Brooklyn, N. Y., April 20, forming hat bodies (of wool); Thomas Blanchard, New York, June 14, and H. A. Wells and R. W. Peck, Sept. 22, batting or web for hat bodies (of fur). [Mr. Wells, the inventor of the process now in general use for forming the bodies of fur hats, by depositing the material directly upon a hollow, perforated cone, revolving in connection with an exhausting

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(1) Whitney's Metallic Wealth of United States.

fan, obtained the first idea while experimenting in 1833 with Blanchard's machine above named, in which he was interested, and which, though unsuccessful, probably contained the germ of the valuable mechanism now in universal use. Mr. Wells went to England to introduce the patents here named, and found a Mr. Williams endeavoring to supersede the use of the bow in making hats by means of similar machinery, which failed; and in November, 1844, the former filed his caveat for the improved process in the United States Patent Office.]—John W. Cochran, New York, April 29, Daniel Leavitt, Cabottsville, Mass., April 29, and Curtis Parkhurst, Lawrenceville, Pa., Sept. 25, each a patent for many chambered fire arms. In 1836 Cochran's rifles were finished at a factory in Springfield, at the rate of eight per week. Cyrus Alger, Boston, May 30, cast-iron cannon; John Hatfield, Stillwater, N. Y., June 8, dipping loco-foco matches; Charles Goodyear, New York, June 17, divesting caoutchouc of its adhesive properties; Stephen C. Smith, New York, Dec. 7, manufacture of India Rubber. [The patent of Mr. Goodyear was the first granted to him in that branch, and that of Mr. Smith was the first American patent for making India rubber boots, shoes, and overshoes, by simply giving them a thin coating of the gum. Mr. Goodyear the next year obtained a patent for making them wholly of that material.]—John B. Ogden, New Jersey, and John Ericsson, subject of the king of Sweden, July 19, sounding instrument for ascertaining the depth of water, etc.; William Hobbs, Springfield, Mass. Dec. 20., secret safety locks; N. J. Wyeth, Cambridge, Mass., Dec. 1, preparing ice for shipping.

1838 The financial difficulties which overtook the country early in the last year, and led to a universal suspension of the banks, as a consequence of previous inordinate importations, injudicious speculation, and a redundancy of paper currency, was still further increased by a general failure in the grain crops of 1837 and 1838, which raised the price of flour to $10.25 per barrel, and caused a considerable amount to be imported, thereby adding to the drain of specie. But little relief was experienced by the partial resumption of the banks in the early part of this year, the reduction in the amount of imports, and the return of a good wheat-harvest in the present year. The agriculture of the country received an increased amount of capital, skill, and fostering legislation; but manufacturing enterprises were generally suspended, by the glut of foreign goods and the pecuniary embarrassments of this period.

The Silk Culture, which, for several years, had received an increasing amount of attention, was the subject of a Congressional report by the Committee on Agriculture, on April 20. Bounties continued to be paid in different states for raw silk. On April 2, the Legislature of Pennsylvania passed an act to promote the culture of silk, giving premiums of twenty cents a pound for cocoons, and fifty cents for reeled silk, produced in the state, until the year 1843. Toward the close of the year, the silk business, which had already felt the speculative impulse of the times, received a sudden increase, manifested by a rise in the price of mulberry-trees, especially of the multicaulis kind, the price of which rose to forty, fifty, and seventy-five cents, and soon after to between one and two dollars apiece. The culture, importation, and sale of trees chiefly characterized the silk husbandry of the country at this time; and much less attention was bestowed upon the production of raw or manufactured silk. The fictitious value given to mulberry-trees during the next year or two by the prevalent enthusiasm was not of long continuance; and the healthy development of the silk culture received a sudden check by the depression which is sure, sooner or later, to follow an unwholesome stimulation. All manufactured silks were at this time admitted duty-free, except sewings, which paid a duty of twenty-eight per cent., that enabled the American producer to compete with the foreign article in our own markets. Nearly all the raw silk produced in the country was manufactured into sewing-silk, and experienced silk-growers deemed it useless to attempt to promote its culture by a duty on raw silk, with an additional duty on sewings, or a like duty upon all silk manufactures imported. This protection was not afforded until the business had received an almost fatal check by the revulsion in the mulberry culture which followed, causing its almost entire abandonment and destruction of the nurseries. On December 11, a Convention of silk-growers was held in Baltimore, at which about two hundred delegates assembled, who elected Judge Comstock, of Connecticut, president. Resolutions were adopted to form a National Silk-Society (which was organized the next day), and to issue an address to the people of the United States on the culture of silk. They also recommended the Piedmontese reel as the best in use; that cultivators of the mulberry should give attention to the production of silk; that auxiliary silk-societies be formed in the several states; and that another convention be held in Washington in December, 1839. Much practical information was given by members of the convention. Specimens of silk ribbons and galloons manufactured in three weeks from the tree, and woven at the rate of three hundred yards a day, by a young woman, after only three months instruction, upon a loom recently invented in Massachusetts, and certified by a silk-merchant of thirty years experience to be as good as he ever saw, were exhibited to the convention. The National Silk-Society resolved the next day to establish a national silk-journal, devoted to the advancement of the silk cause in the United States, the first number of which was issued in January following.

The value of domestic manufactures exported this year was $8,397,078; of which American cotton goods constituted a value of $3,758,000. or upward of forty-four per cent.

The Howe Pin Manufacturing Company, at Birmingham, Conn., commenced this year the manufacture of "solid-headed pins," under a recent patent obtained by J. J. Howe. The article proved more economical to the consumer by saving the waste and inconvenience occasioned by the slipping down of the spun-head previously in use, while the cost of production was from one-fourth to one-third less, weight for weight, than before, on account of the saving in time, weight of metal employed, etc.

A joint Resolution of the two houses of Congress directed a gold medal to be presented to the son of James Ramsey, of Virginia, as a public acknowledgment of the services of his father in first successfully applying steam to the propulsion of vessels.

An improvement was made in the electro-magnetic machine by Dr. Page, formerly of the Patent Office, by which currents were generated sufficiently powerful to decompose water.

The manufacture of gold spectacles and gold and silver thimbles was commenced at Long Meadow, Mass., by Dimond Chandler, whose successor still carries on the manufacture.

PATENTS.—Among the most important patents issued this year are the following: to Erastus B. Bigelow, Mass., for an improvement in the loom for weaving knotted counterpanes; to David A. Morton, Groton, N. Y., for an improvement in the mode of attaching springs to carriages; to John Ericsson, New York, for an improvement in propelling steam vessels; to A. D. Ditmars, Chester County, Penn., for a mode of preserving grass for hay by excluding it from the air in bins lined with sheet-lead; to Isaac Sanderson, Milton, Mass., for a discovery in the manufacture of brown paper from a new material called sand-grass; to David Bruce, jr., Bordentown, N. J., for machines for casting and smoothing printing-type; to George C. Lobdell, Wilmington, Del., for an improvement in the mode of making cast-iron car-wheels; to Joseph Harrison, jr., Philadelphia, for an improvement in railroad cars, carriages, and axles; to Frederick Tudor, Boston, Mass., for an improved mode of packing and storing ice; to John Howard Kyan, of Great Britain (by special act of Congress, much censured at the time), a patent for preserving vegetable substances, especially timber, from decay, known as the Kyanizing process; to Nathaniel Bosworth, Philadelphia, for an improvement in the manner of constructing steam-engines; to Charles Goodyear, Roxbury, Mass., for an improvement in manufacturing gum-elastic shoes; to A. A. Hayes, Boston, for a process of extracting tannin from astringent barks; to Cyrus Alger, Boston, for an improvement in the manufacture of ploughs of cast-iron; to Thomas and James Keane, Haverstraw, N. Y., for an improved mode of constructing metal bench-vices; to Walter R. Johnson, Philadelphia, for an improvement in the art of increasing the strength of wrought-iron and steel; to Col. Stephen H. Long, U. S. A., for a suspension and brace bridge; to Elisha K. Root, Collinsville, Conn., for a machine for punching and forming the eyes of axes, hatchets, etc.; to Stephen Ustick, Philadelphia, for an improved brick-press.

The closing year of this decade presents few events of importance in our industrial history. The Silk bill commanded a large share of public **1839** attention; but there were symptoms that the speculation in mulberry trees had reached its height, and would be followed by a reaction. Many who purchased trees in the autumn of the last year in the expectation that, for every thousand dollars invested, they would realize fifty thousand by the sale of the increased buds, were disappointed in their calculations. Morus multicaulis trees were offered in great abundance at "three cents per tree, healthy and well branched;" and a writer ventured to predict that their value in the autumn of 1840 would not exceed three dollars per cart-load. Mr. Physic, of Germantown, Pa., had four hundred thousand mulberry trees growing, and one million of silk-worms, which number he expected soon to increase to fifty millions. His cocoonery was the largest in the world. The "Atlantic Silk Company," Nantucket, capital $400,000; the "Valentine Silk Company," Providence; the Poughkeepsie Silk Company; and the Northampton Silk Company, capital $80,000,—had all sunk their capital and had ceased operations.

The establishment in July of this year of the *Merchant's Magazine*, by the late Freeman Hunt, Esq., deserves to be noted, as an event having an important influence in shaping the commercial and industrial history of the country. The work, through the judgment, enterprize, and integrity of its editors and publishers, and the ability of its contributors, became a popular and authentic exponent of the principles of sound mercantile policy, and a comprehensive record of the leading facts which have marked our material progress during nearly a quarter of a century. It is now, in fact, an almost indispensable appendage to the counting-rooms of the merchant and manufacturer, both in America and in Europe.

Among the developments of the railroad enterprise of this period at home and abroad is the interesting fact, that Messrs. Baldwin, Vail and

Hufty, of Philadelphia, received this year applications from railroad companies in England for a supply of locomotives from their establishment.

An important improvement in the manufacture of Caoutchouc was patented in February, by Mr. Charles Goodyear, of New York. Under the name of vulcanized India rubber he introduced an article in which caoutchouc was combined with sulphur, whereby it is enabled to retain its elasticity at all temperatures, and to withstand any heat short of the vulcanizing point, and any or all known solvents. By its means an abundant natural product, of little value before, has become of great importance in manufactures and the arts. Thousands of operatives are furnished profitable employment; and the lives of great numbers exposed to cold and dampness are, by its uses as clothing, annually saved. It is also constantly found to answer as an excellent substitute for substances the supply of which is becoming inadequate, such as whalebone, tortoise-shell, ivory, etc. At the present time the manufacture of vulcanized rubber in this country embraces clothing of all descriptions, boots and shoes, car-springs, belting and steam-packing for machinery, balls and toys for children, combs, and whalebone, and a great variety of goods made of the hard rubber or rubber ivory.[1]

On the 17th of September, Matthew Carey, of Philadelphia, departed this life, in the eightieth year of his age; and by his decease the system

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(1) Caoutchouc or India rubber first made its appearance in this country some forty years ago, in the shape of overshoes. In 1823 there were five hundred pairs of shoes imported into the Boston market, and in 1825 Mr. Thomas C. Wales, of Boston, who was soon after awarded the soubriquet, which he still maintains, of being "*the* rubber-shoe man," first introduced to the public the original Para rubber overshoe in its rough, unfinished state, as made by the Indians of that country. This Para shoe had the entire market of the United States, without competition, from 1825 to the time when the first "Goodyear Patent-shoe" was manufactured in Providence; and even after that, the sales of the "old-fashioned rubbers," as they were called, continued to increase. Mr. Wales, though agent for both, advised the importers to send out lasts to the Indian shoemakers, and by this means so improved the shape of the imported shoe that it would eventually have driven the only patent shoe then known out of market. In the year 1830 or 1831 Mr. Charles Goodyear was passing the depot of the Roxbury Company in New York, and stopped to look at a life-preserver. On examining the tubes by which they were inflated, it occurred to him that he could improve their construction. Some months after this he presented a specimen of his improved tube to the agent of the company, with a view of disposing of it to them. The agent, pleased with his success, advised him to turn his attention to an improved mode of manufacturing rubber. From that time Mr. Goodyear devoted his whole time and attention to this subject. Unsuccessful for years, he persevered, against the advice of his relatives and intimate friends, under the most distressing and embarrassing pecuniary circumstances, till at last, when almost compelled to abandon his experiments, he succeeded in vulcanizing India rubber,—a result which has given him a world-wide celebrity.—*Leading Pursuits*, by E. T. Freedley.

of protection to home industry lost one of its most able and indefatigable advocates. For years he had fought the battle of the American manufacturer almost single-handed, and it was not until after his decease that his countrymen fully appreciated the wisdom of his political philosophy and the ardor and sincerity of his philanthropy.

Patents.—Among the most important patents issued this year are the following: to Charles Goodyear, assignee of Nathaniel Hayward, Woburn, Mass., for improvements in the manner of preparing caoutchouc or India rubber; to Moncure Robinson, Philadelphia, for a chair having a shoulder on one side only, for railroads; to William C. Grimes, York, Penn., for a smut machine; to William W. Wiswell, Portland, Me., for cutting coats without back, side, or lapel seams; to Cadwalader Evans, Pittsburg, Penn., for improvements in steam-boilers, and apparatus to prevent explosions thereof; to Stephen Vail, Speedwell Iron Works, N. J., for an improved jack-screw; to William Whittemore, jr., West Cambridge, Mass., for an improvement in the roller-gin for ginning cotton; to Jacob D. Custer, Norristown, Penn., for reversing the motion of steam-engines; to Noble Jerome, Bristol, Conn., for an improvement in clocks; to Joseph Priestly Peters, New York, for a machine for counting pills; to Eliphalet Nott, Schenectady, N. Y., for improvements in Nott's coal-stove; to James Banta, Utica, N. Y., for a machine for packing flour; to Samuel Colt, Conn., for improvements in fire-arms; to Isaac McCord, Harrisburg, Penn., for wire tiller-ropes; to Conrad Liebrich, Philadelphia, for an improved double-catch bolt-lock; to Thomas Shriver, Cumberland, Md., for improvements in coaches and other carriages, extending the perches beyond the jack-bars and axles; to Henry Crum, Clarkstown, N. Y., for a machine for turning in the heads of wooden screws and rivets; to Herman Haupt, York, Penn., for a truss for a bridge; to Thomas Raeny, Philadelphia, for an improved spark-arrester; to Frederick R. Dimpfel, New York City, for a blowing apparatus for furnaces; to Isaiah Jennings, same place, for a new combination of ingredients for burning in lamps; to George S. Griggs, Roxbury, Mass., for a self-acting brake for railroad cars.

CHAPTER VI.

THE MANUFACTURES OF THE UNITED STATES.

1840—1860.

We are now approaching a period when the manufacturing industry of the country, established upon a solid and permanent foundation, had attained such wonderful expansion that it is no longer possible to trace its progress in detailed statements or isolated facts. In spite of temporary checks and adverse legislation, the Anglo-Saxon steadily widened the circle of his enterprises, until the sound of his hammers rung throughout the whole extent of the populated portion of the republic; and the chronicler of his achievements, bewildered by the multiplicity of details, and abashed at the magnitude of the task, gladly takes refuge behind the imposing, though not always reliable, computations of the decennial census-takers.

Turning to the census of 1840 for information as to the state of Manufactures at that date, we are astonished as well as embarrassed by the meagreness of details. Even of the leading branches in some instances only the capital is given, in others only the product; and we confess we do not know by what rule in arithmetic or mensuration any one could have calculated from official data that the capital invested in manufactures at that date was $267,726,579.

Aggregate of the Statistics of Manufactures in the United States, on the First of June, 1840.

	No. of Establ'm'ts.	Capital Invested.	Hands Employed.	Value Produced.
Bricks and lime			22,807	$9,736,945
Carriages and wagons		$5,551,632	21,994	10,897,887
Cotton	1,240	51,102,359	72,119	46,350,453
Chocolate				79,900
Confectionery				1,143,965
Cordage	388	2,465,577	4,464	4,078,306
Hardware and cutlery			5,492	6,451,967
Drugs, medicines, paints, dyes, etc		4,507,675	1,848	4,812,726

	No. of Establ'm'ts.	Capital Invested.	Hands Employed.	Value Produced.
Earthenware	659	551,431	1,612	1,104,825
Flax		208,087	1,628	322,205
Fire-arms			1,744	
Furniture		6,989,971	18,003	7,555,405
Granite			3,734	2,442,950
Glass	115	2,084,100	3,236	2,890,293
Hats, caps, bonnets		4,485,300	20,176	10,180,847
Iron, cast	804	20,432,131	30,497	286,903 tons.
" bar	795			197,233 "
Machinery			13,001	10,980,581
Metals, precious			1,556	4,734,960
" various			6,677	9,779,442
Mills, flour	4,364	65,858,470	60,788	7,404,562 bbls. 76,545,246
" grist	23,661			
" saw	31,650			
" oil	843			
Musical instruments		734,370	908	923,924
Leather—				
Tanneries	8,229	15,650,929	26,018	33,134,403
Other factories, including saddleries	17,136	12,881,262		
Liquors, distilled	10,306	9,147,368	12,223	41,402,627 galls.
" fermented	406			23,267,730 "
Paper	426	4.745,239	4,726	6,153,092
Powder	137	875,875	496	8,977,348 lbs.
Printing and	1,552	5,873,815	11,523	7,016,094
Binding	447			
Ships and vessels			767	119,814
Silk		274,374	15,905	6,545,503
" mixed		4,368,991		
Soap and candles		2,757,273	5,641	
Sugar refineries	43			3,250,700
Tobacco		3,437,191	8,384	5,819,568
Wool		15,765,124	21,342	20,696,999

It appears that the manufacture of Cotton goods was then, as now, the leading branch, giving employment to over seventy thousand persons, and requiring a capital of over fifty millions of dollars. There were thirty-six print-works, which turned out over a hundred million yards of printed goods annually; and so skillful were the manufacturers in imitating new foreign designs, and so rapid in executing them, that the importers of choice styles were not unfrequently undersold in a few days by the domestic commission-houses.[1] In the manufacture of Woolens less progress had been made, but the capital invested exceeded fifteen millions of dollars, employing over twenty thousand persons, and yielding a product valued at $20,696,999. In Baltimore there was an establishment employing some fifteen or twenty Jacquard looms in manufacturing Silk and Worsted vestings; and there were several manufactories in various parts of the country engaged in producing sewing-silk, fringe, tassels, gimp, satin, velvet, and other silks. The whole demand of the country for Leather was supplied from American tanneries; and in every town of any importance there were manufactories of harness and saddlery, boots and trunks. Of Hats enough were made for domestic consumption, and a surplus was left for exportation. The American Flint-Glass rivaled in solidity and elegance that of foreign countries; and in the entire manufacture, including window-glass, bottles, etc., over eighteen hundred men were employed, who produced a value of nearly three millions of dollars. Of Soaps and Candles the American manufacturers, besides supplying the home market had, including spermaceti candles, over a million of dollars worth to export. Domestic Hardware, which, a few years before, could with difficulty be sold except with foreign labels, was now firmly established in popular favor.[1] At an establishment in New York State, fifty tons of horse-shoes were turned out daily, and sold, ready to be used in shoeing the animal, at five cents per pound.

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[1] On the 1st of February, 1840, a new pattern of mousseline de laines arrived from France at New York, and was offered by the importer at fourteen cents per yard by the

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case. The agent of a Rhode Island calico-printing establishment forwarded a piece of the new style of goods to Providence the day after their arrival; and in sixteen days he had the same style of goods, and of equal fabric, in New York, selling at ten cents per yard. The manufacturer had but twelve days to engrave the new pattern on a copper cylinder, from which the engraving was raised on a steel cylinder, then hardened and made ready for impression; the compound of ingredients for colors discovered by chemical experiments; the cloth printed, dried, and cased for market.

(1) In 1830, it is estimated that the value of all the Saws manufactured in the United States did not exceed five thousand dollars per annum. At that time Mr. Charles Griffiths commenced in Boston the manufacture of circular, mill, pit, and cross-cut saws, and soon after was joined by Mr. William Welsh, establishing the now well-known firm of Welsh & Griffiths. They say, for a long time obstacles in the way of success were many: there was a strong prejudice existing in the minds of many against the new goods, which it was very hard to combat. The saws, however, were soon found to be fully equal to the task of cutting through that obstinate quality, as well as through the hardest oak that ever grew. From the year 1830 until now,—1863,—a period of thirty-three years, the firm has been steadily progressing and extending their operations, so that, at the present time, there are very few first-class mills, in the United States or the Canadas, but daily resound with the buzz of these celebrated saws. Their well-earned reputation has now become as familiar as household words.

In the same year (1830) Mr. S. C. Bemis commenced at Springfield, Mass., the manufacture of fine-polished dividers, calipers, compasses, punches, bevils, etc. He states also that at the commencement there was a strong prejudice against American manufacturers of hardware, and goods were only sold through commission-houses who had little or no capital; and most of the manufacturers met with heavy losses

In certain important branches of manufactures there were machines and processes employed to facilitate the production and reduce the cost, which were wholly unknown in other countries. The stocking or power-weaving loom was in use here long before it had been introduced into England. By its aid, a girl, receiving two dollars and fifty cents per week, could knit a piece, twenty-eight inches in width and one inch long, in a minute, and make twenty pairs of drawers in a day; while, by the hand-loom, two pairs were a full day's work. Pins were made with a rapidity still more astonishing, and fastened in papers, by a process unknown in England.[1] The price of Hooks and Eyes, which, thirty years previously, was one dollar and fifty cents per gross, had been reduced to fifteen and twenty cents for the same quantity. At one establishment in New Britain, Conn., eighty to one hundred thousand pairs per day were made and plated by a galvanic battery, on the cold silver process. In Brass Clocks, of course our countrymen had no rivals. The manufacturers of Connecticut alone turned out over a million dollars worth per annum; and were just beginning to export them to England, where they sold at first at an advance of two thousand per cent. on cost.[2]

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in 1837. Since then the manufacturers have sold their goods direct to the trade, and the American manufacturers generally have been doing an increasing and paying business. The goods made by Mr. Bemis have always stood high in the market, and have repeatedly taken the highest premium at the American Institute in New York, and at fairs in Philadelphia and Boston. The business has of late years been transacted by a son of the original proprietor and Amos Call, the head-mechanic, under the name of Bemis & Call, Hardware and Tool Company, who are now manufacturing large quantities of goods of various kinds.

In 1833, Mr. N. C. Sanford, of Meriden, Conn., commenced the manufacture of Skates, and was the first in this country to engage in skate-making as a specialty. He has taken out several patents for improvements on the old style of skates, and claims that the "parlor-skate," now so popular with the ladies, was worked out and used by him nearly twenty years before it was patented by another person.

(1) "A manufactory near Derby, Conn., has a contrivance for sticking pins on paper which is quite marvellous. It takes, in England, sixty females to stick in one day, by sunlight, ninety packs, consisting of 302,460 pins. The same operation is performed here, in the same time, by *one* woman. Her sole occupation is to pour them, a gallon at a time, into a hopper, from whence they come out all neatly arranged upon their several papers. The mechanism by which the labor of fifty-nine persons is daily saved yet remains a mystery to all but the inventor; and no person, but the single woman who attends to it, is, upon any pretext whatever, allowed to enter the room where it operates."

(2) "For the last three years," says a correspondent of the *Rochester Democrat* residing at Hartford, "we have been gradually pushing our *notes of time* into foreign countries; and such has been our success that within a few hours' ride of this city one thousand clocks are finished daily, and it is a fair estimate to put down five hundred thousand clocks as being manufactured in this State last year. This year the number will be still increased, as John Bull is so slow in his movements that there is no hope of reform until he has plenty of Yankee moni-

But while the Clockmakers, Hardware manufacturers, and others were extending their enterprises, and opening new markets for their products, the financial condition of the country was far from prosperous. Money was steadily flowing to England and other foreign countries; credit at home and abroad was nearly annihilated; labor was depreciated, and the prices of farm products were nearly fifty per cent. less than had been obtained but a few years before. Cotton had fallen to seven cents per pound; pork and beef to eight dollars a barrel; wheat to one dollar and twenty-five cents a bushel; and hams, lard, and butter to from six to seven and one-half cents a pound. Farmers and planters were unable to pay their debts, and sheriffs' sales were universal where stay-laws had not been enacted to protect the debtor from his creditor. The imports of foreign merchandise, which, in 1834–35, had reached one hundred and twenty-nine millions of dollars, declined in the three years ending in 1842 to eighty-eight millions. Banks were in a state of suspension, and the Federal Government was driven to the use of an irredeemable paper currency, and even with that found itself so totally unable to meet the demands upon it that the President himself was unable to obtain his salary at the treasury, and forced to seek accommodation from the neighboring brokers.[1] In this emergency, Congress, notwithstanding the compromise previously alluded to, passed the tariff of 1842, which largely diminished the list of free goods, and established an average charge of thirty-three per cent. upon those dutiable. (*See Tariff of* 1842–62, *post.*) The passage of this tariff, recognizing protection to American industry, was followed by effects which an able writer on Political Economy has styled "almost magical."[2] "How wonderful," he says, "were the effects of the tariff of 1842 will be seen

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tors. These we are now sending him by every ship that clears from our seaports. In 1841, a few clocks were exported there as an experiment. They were seized by the custom-house in Liverpool on the ground that they were undervalued. The invoice-price is one dollar and fifty cents, and the duties twenty per cent. They, however, were soon released, the owner having accompanied them and satisfied the authorities that they could be made at a profit even thus low. Mr. Sperry, of the firm of Sperry & Shaw, was the gentleman who took out the article. He lost no time, after getting possession of his clocks, in finding an auction-house. They were made of brass-works cut by machinery out of brass plates, and a neat mahogany case enclosed the timepiece. They were a fair eight-day clock, but wholly unknown in England. The first invoice sold for four to five pounds sterling, or about twenty dollars each. Since that time every packet carries out an invoice of the article; and forty thousand clocks have been sold there by this one firm, —Sperry & Shaw. Others are now in the business, and the north of Europe has become our customers. India, too, is looked to as a mart for these wares. Several lots have been forwarded to the ports of China."

(1) American Labor *versus* British Free-Trade, by Henry C. Carey, Esq.

(2) Henry C. Carey.

upon a perusal of the following brief statement of facts. In 1842, the quantity of iron produced in the country but little exceeded two hundred thousand tons; by 1846 it had grown to an amount exceeding eight hundred thousand tons. In 1842, the coal sent to market was but one million two hundred and fifty thousand tons; in 1847, it exceeded three millions. The cotton and woolen manufactures, and manufactures of every kind indeed, grew with great rapidity; and thus was made everywhere a demand for food, cotton, wool, tobacco, and all other products of the field, the consequences of which were seen in the fact that prices everywhere rose; that money became everywhere abundant; that farmers and property-holders generally were enabled to pay off their mortgages; that sheriffs' sales almost ceased; and that the rich ceased to be made richer at the expense of those who were poor."

A succinct recital of the circumstances which attended the passage of this famous Tariff act, and those subsequent thereto to the present time, is given in the following—

HISTORY OF TARIFFS FROM 1842 TO 1862.

The operation of the Compromise Tariff Act went on by biennial reductions until 1841. During those years, however, great changes overtook the commercial world, and the finances of the government were powerfully affected by them. One effect of the passage of the Tariff of 1828 had been to diminish the import of goods, and to induce, as a consequence, a larger importation of specie. This circumstance gave greater strength to the Banking movement, at a time when the harvests of Europe being abundant, money was then cheap, and credits liberal. These circumstances initiated a season of speculation, which was fostered by the war that had sprung up between the government and the United States Bank. The government, on removing the deposits, placed them with State banks, with the reiterated injunction to "loan liberally to merchants." The numberless circumstances that combined to bring about the revulsion of 1837, and the suspension of the banks, by cutting short the importation of goods, ruined the government revenue, and reduced it to the issue of Treasury notes to meet current expenses. The large imports of the year ending with 1836, had, on the extinguishment of the public debt, caused a large surplus revenue to accumulate which had to the extent of twenty-eight millions been divided among the States. The revulsion now compelled a return to the Tariff for means of revenue. The compromise bill had however guaranteed, that after 1842, twenty per cent. should be a maximum duty, except in case of war. It was not thought advisable to violate that Compromise, but the twenty per cent. tax was laid upon a large portion of the articles that had been made free by the Compromise act. This did not meet the requirement, since in that year the value of free articles imported fell from thirty-six to thirty millions, while those dutiable increased less than eight millions. This did not however prevent Congress from passing a law to distribute the proceeds of the public land sales pro rata among the several States. The law was to become inoperative if the compromise limit of twenty per cent. duties should be infringed. The Tariff, therefore, became a question again in the following year. The wants of the government were made the basis of a new movement, similar to that of the Harrisburg Convention, and a "home league" was formed, October 15, 1841, with the object of restoring the high rates. The proceedings of the "home league" were endorsed by Mr. Clay and the other friends of the "American policy." The President, in his annual Message, December, 1841, called attention to the necessary revision of the Tariff, advising a moderate increase, and a change of the home-valuation principle. The debate upon this passage of the message again opened up the whole question of protection. The financial distress of the Federal government made more revenue urgent, and the distress of the manufacturers was urged as a reason why those duties should be high. While urging high duties, however, to supply the government revenues, it was proposed to repeal that section of the Land-distribution act, which, by its operation, brought the land revenues back into the Federal treasury upon the violation of the Compromise act.

In the Senate, Messrs. Calhoun, Bagby, Benton, and Woodbury, contended with Messrs. Clay, Evans, and others; and in the House the debate was very general. Mr. Clay declared the government wants to be the paramount necessity, and appealed to the patriotism of all parties to supply them. Mr. Calhoun objected to the proposed Tariff that it was worse than that of 1828. The average rate was, indeed, ten per cent. less, but the substitution of cash duties for bonds or long credit, the substitution of specific for ad valorem rates on articles that had fallen in value, the home valuation of goods, the arbitrary mode of collecting, and the fact that it went into operation immediately on its passage, all tended to enhance its injurious features. He said: "I shall not dwell on the fact that it openly violates the Compromise act, and the pledges given by its author, and by Governor Davis, of Massachusetts, that if the South would adhere to the compromise while it was operating favorably for the manufacturers, they would stand by it when it came to operate favorably for the South. I dwell not on those double breaches of plighted faith, although they are of a serious character, and likely to exercise a very pernicious influence over our future legislation, by preventing amicable adjustments of questions that may hereafter threaten the peace of the country." The Bill was passed, with a clause repealing the clause of the land law which suspended the distribution of the public lands, making the distribution unconditional. For this it was vetoed, August, 1842, by John Tyler.

The debates were full, but with comparatively little excitement, and since the want of revenue was so apparent, the bill became a law, without the obnoxious clause: Messrs. Buchanan and Wright voting in favor of it for revenue reasons, but under protest. The law went immediately into operation. Among the changes that it introduced were the payment of duties in cash on the home-valuation, by which the Collector of the port where any description of goods should be imported, was to cause to be ascertained the actual value of the article in the principal markets of the country where it was exported, and at the time of export. To this value should be added costs and charges, including commissions, and the aggregate to be the value on which the duties are charged. All goods of wool imported in an unfinished state, shall be valued as if entirely finished at the place of export. The appraisers, collectors, and naval officers, were to have power to examine parties under oath in relation to values. These were some of the provisions that were considered very onerous. The Tariff went into operation at a time of great general depression in the commercial world, and, consequently, in a revenue point of view, it was not so successful as had been hoped. It did not, however, fail to revive the tariff issue at the general elections. The breach of the Compromise was charged, but the passage was denied as a party measure. The average charge upon dutiable goods under it was thirty-three per cent., and it yielded an annual average of twenty-six million dollars. The change of administration was in 1846 followed by the Mexican War, and views in respect of the tariff policy were again changed. The new administration proposed three important measures in relation to the duties. The first, to abandon the protective theory in favor of a revenue theory,—that is, to reduce the rates of duty, to levy them ad valorem only, to make the rates uniform, and to make them payable in cash; the Warehouse system, to facilitate the carrying trade; and the Independent Treasury, by which the cash duties were to be collected in gold and silver only. The message of the President, December, 1841, remarked upon the importance of revenue rather than protection, and advised a reduction of existing rates as necessary to an increase of revenue. The Secretary of the Treasury made an elaborate report of the same tenor, recommending a revenue tariff, in opposition to a protective tariff, or the adjustment of the imports to such a point as would collect the largest revenue without checking the importation, or, in other words, the course of trade. Such a bill was introduced from the Committee of Ways and Means, by Mr. M'Kay, April 14, 1846. It made eight schedules, in one of which all liquors were charged seventy-five per cent. ad valorem; and all other goods, under their respective schedules, thirty per cent., twenty-five per cent., twenty per cent., fifteen per cent., ten per cent., five per cent., ad valorem, and the remainder free. It was estimated that these duties would give an average of twenty-four per cent. on the dutiable imports, and greatly increase the sum of the duties by admitting a larger trade. This bill was accompanied by the "Warehousing act," which provided for the payment of duties in cash, and that goods may be deposited in the public stores, subject to the order of the owner, for one year, upon the payment of duties; that goods in bond may be transported to any other port of entry, and other provisions tending to facilitate the operations of commerce. These bills again opened up the Tariff discussion. But the former discussions had exhausted argument, pro and con, and there could be little more said on the subject. Mr. Collamer defended the protective principle because "it was necessary to national independence," and the Tariff of 1842, "because it gave revenue enough;" and he denounced the abandonment, as intended in this bill, of protection as a principle of national government. Mr. Rathbone opposed the new bill as "not likely to give sufficient revenue." The debate was very general, but the tariff passed the House, July 3, by a vote of one hundred and fourteen to ninety-five, to go into operation December 1, 1846. The operation of the Tariff was extremely simple, all articles not free being charged with ad valorem duties. The Warehouse system was organized, as also the Independent Treasury system, and the course of trade soon adapted itself to the new regulation of specie payments. The Tariff operated ten years and seven months, viz., from the 1st of December, 1846, to the 1st of July, 1857, and in accordance with the estimates, it averaged twenty-four and one-half per cent. on the dutiable imports. The average duties under the tariff of 1842 had been twenty-six millions dollars per annum. The average of the Tariff of 1846 was forty-six millions dollars per annum during its operation. It is to be borne in mind, however, that the effect of the gold discoveries, by imparting great activity to trade in general, promoted larger aggregate exports from the country, which, since it had become a gold-exporting country, could receive its pay only in those goods which were charged with duty. The same influence had also caused a rise in the value of commodities, and, of course, a larger yield to ad valorem duties operating upon those high values.

The same causes which had imparted such activity to the import trade, had given animation to manufactures of all descriptions; and, while the government treasury was overflowing, the general prosperity was apparently sound. The large revenue yielded by the Tariff was in excess of the expenditures, and a considerable accumulation of gold took place in the Treasury vaults. This was not quite in accordance with the sub-treasury law, which contemplated an amount of revenue no greater than the expenditure, so that gold should pass through the Treasury without stopping, thus keeping the specie currency active. The accumulation was felt to be an inconvenience, and the government sought to reduce it by the purchase of its outstanding stock at high premiums; but a permanent remedy was proposed in a reduction of the rates of duty upon all imported goods.

President Pierce, in his message of December, 1856, called attention to the annual report of Mr. Guthrie, Secretary of Treasury, in relation to the necessity of reducing the duties. The report set forth the large revenues in excess of the wants of the government, and argued that as all duties are a tax upon the people, they should be reduced when no longer required for the public service. It advised the placing of all materials that enter into manufactures, such as are free in Great Britain, upon the free list, and also salt, as a necessity for Western provision packers. A Tariff bill was, in accordance with these recommendations, reported in the House, January 14, and engaged discussion. Mr. Durfee, of Rhode Island, advocated free materials, but wished to discriminate in favor of American manufactures. There was but little general interest manifested in the country in respect to the proposed changes. The manufacturers of the East seemed more disposed to favor the free importation of raw materials, than to increase the tax upon the imported goods. The merchants of New York petitioned for the removal of the duties on sugar. The debate in the House went on until January, when it became more general upon the bill reported by the Committee of Ways and Means. Mr. Stanton, of Ohio, said it was very evident that the revenue must be reduced, but that the bill offered was a manufacturers' bill, intended to favor the wool-manufacturers of the East at the expense of the wool-growers of the West. Mr.

Washburn, of Illinois, wanted lead protected. Mr. DeWitt, of Massachusetts, favored the reduction of revenue by freeing raw materials. In the Senate, Mr. Adams, of Mississippi, proposed making railroad iron free. In the House, Messrs. Smith and Garnett, of Virginia, favored free trade. Mr. Letcher proposed a reduction of twenty per cent. on the tariff of 1846. Mr. Campbell, of Ohio, offered a substitute for the bill, of which the general features were nearly the same as those of the Committee of Ways and Means. This finally passed, one hundred and ten to eighty-four. Mr. Stanton, of Ohio, denounced it as passed by "fraudulent combination of those who favored the protection of hemp, of sugar, iron, and the woolen manufacturers of Massachusetts. It was a blow at the wool-grower." In the Senate, Mr. Hunter substituted a new bill, with large reductions. This was opposed by Mr. Brodhead, of Pennsylvania, who favored the House bills. Mr. Wilson, of Massachusetts, opposed it, because he said the object was to reduce the revenue, and these reductions would increase it by encouraging importation. Mr. Collamer, of Vermont, took the same view of it. Mr. Pugh, of Ohio, opposed both; he said "the wool-manufacturers seek to ruin the wool-growers." Mr. Toombs favored larger reductions. Mr. Butler, of South Carolina, wanted the Tariff abolished altogether. Mr. Toucey, of Connecticut, wanted the revenue diminished by adding largely to the free list. Mr. Hunter's bill finally passed, with an amendment by Mr. Douglas, that wool under twenty cents, foreign valuation, should be free. A Committee of conference finally reported Mr. Hunter's bill, with the free list of Mr. Campbell's. This passed the House, one hundred and twenty-four to seventy-one, March 3d, to go into operation July 1st, 1857.

The effect of the Tariff was to check importation in the spring, and to cause a great accumulation of merchandise in bond, to be released after July 1st. The important reduction from one hundred per cent. to thirty per cent. on spirits, caused a large quantity to arrive, and the failure of the Louisiana sugar crop in that year, added very greatly to the effect of the reduction of the duty upon sugar, from thirty to twenty-four per cent. The elements of revulsion began to manifest themselves with the operations of the Tariff in the first months of which the goods in warehouse were put upon the market. The money-pressure that followed came in aid of the designs of the projector of the tariff, in reducing the revenue, which fell from $63.875,905 in the last year of the tariff of 1846, to $41,780,621 in 1858. This diminution of the customs, added to that of the land sales under the reaction of speculation, carried the revenue far below the wants of the government. This result once more brought with it the necessity for a revision of the Tariff in order to restore the revenue. The circumstances that attended the session of 1860–61 were such as enabled the passage of the bill reported by the committee of Ways and Means, with little debate or investigation. The Act restored the highest protective character of the Tariff, replacing the ad valorem with complicated specific duties, and the bill went into operation at such short notice as caused it to operate upon goods ordered under the old tariff. This Act was followed by another change in August of the same year, and by still another in February, 1862, which is the Tariff in force at the present writing.

ALPHABETICAL ARRANGEMENT OF THE TARIFFS OF THE UNITED STATES, FOR THE YEARS 1842, 1846, 1857, AND 1862.

[REVISED BY HENRY HAY, ESQ., OF THE PHILADELPHIA CUSTOM-HOUSE.]

	1842.	1846. per ct.	1857. per ct.	1862.
Accordions	per cent. 30	20	15	per cent. 30
Acetic acid	" 20	20	4	" 25
Acid, benzoic	" 20	20	4	" 10
" boracic	" 5	20	4	lb. 5 c.
" citric, white or yellow	" 20	20	4	lb. 10 c.
" muriatic	" 20	20	4	per cent. 10
" nitric, or nitric fort.	" 20	20	15	" 10
" oxalic	" 20	20	4	lb. 4 c.
" pyroligneous	" 20	20	4	per cent. 10
" tartaric, in crystals or powder	" 20	20	4	lb. 20 c.
" sulphuric, or oil of vitriol	lb. 1 ct	10	4	lb. 1 c.
Acids, all kinds of, used for chemical and manufacturing purposes	per cent. 20	20	15	(not otherwise provided for, free.)
Acids, used for medicinal purposes, or in the fine arts, not otherwise provided for.	" 20	20	4	per cent. 10
Acorns	" 20	20	15	" 10
Adhesive plaster, salve	" 30	30	24	" 40
Adzes	" 30	30	24	" 35
Ale, in bottles	gal. 20 cts	30	24	per gal. 30
" otherwise than in bottles	" 15 cts	30	24	" 20
Alkanet root	per cent. 20	20	15	per cent. 20
Almonds	lb. 3 cts	40	30	lb. 4 cts.
" shelled	" 3 cts	40	30	" 6 cts.
" paste and oil of	" 9 cts	30	24	per cent. 50
Aloes	free,	20	4	lb. 6 cts.
Alspice, oil of	per cent. 30	30	24	per cent. 50
Alum	lb. 1½ cts	20	15	100 lbs. 60 cts.
Ammonia	per cent. 20	20	8	per cent. 20
" sal	" 20	10	8	" 20
" salts	" 20	10	8	" 20
" carb	" 20	20	8	" 20
Ammoniac, crude	" 20	20	15	" 20
" refined	" .20	20	15	" 20
" bole	" 20	20	15	" 50
Ammunition, except gunpowder and musket balls	" 30	30	24	
Animals for breed	free,	free,	free,	(alive, free.)
Antimony, crude	free,	20	8	per cent. 10
Any goods, wares or merchandise of the growth, produce, or manufacture of the United States, or				

	1842.	1846. per ct.	1857. per ct.	1862.
of its fisheries, upon which no drawback, bounty, or allowance has been paid	free,	free,	free,	free.
Apparel, wearing and other personal baggage in actual use	free,	free,	free,	free.
Aqua fortis	per cent. 20	20	4	per cent. 10
Argol	free,	5	free,	lb. 6 cts.
Arms, fire	per cent. 30	30	24	per cent. 35
" side	" 30	30	24	" 35
Arrack	gal. 60 cts	100	30	gal. 75 c. to $1.05
Arrow root	per cent. 20	20	15	per cent. 20
Arsenic, all	" 20	15	4	" 20
Articles of the growth, produce or manufacture of the U. States, or its territories, brought back in the same condition as when exported, and on which no drawback was allowed	free,	free,	free,	free.
Articles, all, composed wholly or chiefly in quantity, of gold, silver, pearl, and precious stones, not otherwise specified	per cent. 20	30	24	per cent. 35
Articles not in a crude state, used in dyeing or tanning, not otherwise provided for	" 20	20	4	(crude, free.) per cent. 20
Articles, all, not free, and not subject to any other rate of duty, raw,	" 20	20	15	" 10
Do. do. manufactured	" 20	20	15	" 20
Articles manufactured from copper, or of which copper is the material of chief value, not otherwise specified	" 30	30	24	" 35
Articles worn by men, women, or children, of whatever materials composed, made up in whole or in part by hand, not otherwise provided for	" 30	30	24	" 35
Artificial feathers	" 25	30	24	" 40
Augurs	" 30	30	24	" 35
Awls	" 30	30	24	" 35
Axes	" 30	30	24	" 35
Bacon	lb. 3 cts	20	15	lb. 2 cts.
Baggage, personal, in actual use	free,	free,	free,	free.
Bags, bead, made in part by hand,	per cent. 25	30	24	per cent. 35
" grass	" 25	30	24	" 35
" gunny	sq. yd. 5 cts	20	15	" 25

	1842.	1846. per ct.	1857. per ct.	1862.
Bags, woolen	per cent. 40	30	24	p. ct. 30 & lb. 18 c.
" worsted	" 40	25	19	per cent. 35
" flax and hemp	" 25	20	15	" 35
" carpet, woolen	' 30	30	24	" 35
" silk	' 30	25	19	" 40
Balls, billiard	' 20	30	24	" 35
" wash	" 30	30	24	per. ct. 30 & lb. 2 c.
Balsam, copaiva	" 25	30	24	lb. 20 cts.
" of Tolu	" 25	30	24	" 30 cts.
" medicinal	" 25	30	24	per cent. 30
" all kinds of cosmetic	" 25	30	24	" 50
Barege, wool, colored	" 30	30	24	(See Woolens.)
" wool, gray	"	30	24	
" worsted, or silk and cotton,	" 30	25	19	per cent. 35
Bark of cork trees, unmanufactured	free,	15	4	" 30
" Peruvian	free,	15	free,	" 20
" all not specially mentioned	free,	20	8	" 10
Barley	bush. 20 cts	20	15	bush. 15 cts.
" pearl or hulled	lb. 2 cts	20	15	lb. 1ct.
Baskets, wood	per cent. 30	30	24	per cent. 35
" osier	" 25	30	24	" 35
" palm-leaf	" 25	30	24	" 35
" straw	" 25	30	24	" 35
" grass or whalebone	" 25	30	24	" 35
Battledores	" 25	30	24	" 35
Bay water, or bay rum	" 25	30	24	gal. 50 cts.
Beans, tonkay	" 20	20	15	per cent. 20
" vanilla	" 20	20	15	lb. $3.
" all other not specially mentioned	" 20	20	15	per cent. 10
Bed feathers	" 25	25	19	" 30
" ticking, linen	" 25	20	15	(See Flax.)
" " cotton	" 30	25	24	(See Cotton.)
" caps	" 30	30	24	per cent. 35
" screws	" 30	30	24	lb. 1¾ cts.
" sides, as carpeting	" 30	30	24	(See Mats.)
" spreads, or covers, of the scraps of printed calicoes, sewed,	" 30	25	24	
Beef	lb. 2 cts	20	15	lb. 1 ct
Beer, in bottles	gal. 20 cts	30	24	gal. 30 cts
" otherwise than in bottles	gal. 15 cts	30	24	gal. 20 cts.
Beeswax	per cent. 15	20	15	per cent. 20
Bell cranks	" 30	30	24	" 35
" levers	" 30	30	24	" 35
" pulls	" 30	30	24	" 35
" metal, manufactured	" 30	30	24	" 35
Bellows	" 35	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Bellows' pipes	" 30	30	24	per cent. 35
Bells, of bell-metal, fit only to be re-manufactured	free,	5	free,	free.
Belts, sword leather	per cent. 35	30	24	per cent. 35
Berries, used for dyeing, all exclusively, in a crude state	free,	5	free,	free.
Berries, not otherwise provided for,	per cent. 20	20	15	per cent. 10
Bichromate of potash	" 20	20	15	lb. 3 cts.
Binding, carpet, if worsted	" 30	25	19	per cent. 35
" cotton	" 30	25	24	" 35
" woolen	" 30	30	24	" 35
" worsted	" 30	25	19	" 35
" silk	" 30	25	19	" 40
" leather	" 30	30	24	" 35
" linen	" 30	20	15	" 35
" quality	" 30	25	19	" 35
Birds	" 20	20	free,	free.
Bismuth	" 20	20	free,	free.
" oxide of	" 20	20	15	per cent. 20
Bitts, carpenters'	" 30	30	24	" 35
Bitumen	" 15	20	4	lb. 3 cts.
Blacking	" 20	20	15	per cent. 30
Black, lamp	" 20	20	15	" 20
" lead pots	" 20	30	24	" 35
" lead powder	" 20	20	15	ton, $10.00
Bladders	" 20	20	15	per cent. 20
Blankets, all	75 c. pc. 15 ov. 75 c. " 25	20	15	Of wool not over 28c. p. lb., 6c. p. lb., p. ct. 15; over 28 and not over 40c., 6c. p. lb., p. ct. 30; over 40c. p. lb. 12c. p. lb., p. ct. 25.
Blankets of mohair or goats' hair,	per cent. 20	20	15	per cent. 35
Bleaching powders	lb. 1 ct	10	4	100 lbs. 30 cts.
Boards, planed	per cent. 30	20	15	per cent. 20
" rough	" 20	20	15	" 20
Bobbin, cotton	" 30	25	24	" 35
" wire, covered with cotton	lb. 8 cts	30	24	" 35
Bodkins, all	per cent. 20	30	24	per cent. 35
Bolting-cloths	" 20	25	free,	free.
Bolts, composition	" 30	30	24	per cent. 35
Bone, black	" 20	20	free,	free.
" alphabets	" 20	30	24	per cent. 35
" chessmen	" 20	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Bone, whale, rosettes	“ 20	30	24	per cent. 35
“ tip and bones	p. ct. 5 & 20	20	4	“ 10
“ whale, other manufact'res of	per cent. 20	30	24	“ 35
“ “ not of the American fisheries	“ 12½	20	15	“ 10
“ manufactures of	“ 20	30	24	“ 35
Bonnets, Leghorn	“ 35	30	24	“ 40
“ all	“ 35	30	24	“ 40
Bonnet wire, covered with silk	lb. 12 cts	30	24	“ 35
“ “ “ “ cotton,	“ 8 cts	30	24	“ 35
Books, blank	“ 20 cts	20	15	per cent. 20
“ periodicals, and other works in the course of printing and republication in the U. S.	lb. 20 & 30c	20	8	“ 20
Books, printed magazines, pamphlets, periodicals, and illustrated newspapers, bound or unbound, not otherwise provided for	per cent. 8	10	8	“ 20
Books of engravings, bound or unbound	“ 20	10	8	“ 20
Books and instruments, professional, of persons arriving in the U. S.	free,	free,	free,	free.
Books, specially imported for the use of schools, etc	free,	free,	free,	free.
Boots	pair $1.25	30	24	per cent. 35
“ laced, silk, or satin, for children	“ 25 c	30	24	“ 35
“ and bootees, of leather	“ $1.25	30	24	“ 35
“ rubber	per cent. 30	30	24	“ 35
Bootees, for women or men, silk	pair 75 c	30	24	“ 35
Borax, or tincal	“ 25	25	4	lb. 5 cts.
“ refined		25	19	lb. 10 cts.
Botany, specimens of	free,	free,	free,	free.
Bottles, apothecaries'	$1.75 *a* $2.25	30	24	per cent. 30
Bottles, black glass		30	24	“ 30
“ perfumery and fancy	gross $2.50	30	24	“ 35
“ containing wine or other articles	gross $3.00	40	30	“ 50
Bougies	per cent. 30	30	24	“ 35
Boxes, gold or silver	“ 30	30	24	“ 35
“ musical	“ 30	20	15	“ 30
“ japanned dressing	“ 25	30	24	“ 40
“ cedar, granadilla, ebony, rose, and satin	“ 30	40	30	“ 35
“ all other wood	“ 30	30	24	“ 35
“ sand, of tin	“ 30	30	24	“ 35

	1842.	1846. per ct.	1857. per ct.	1862.
Boxes, shell, not otherwise enumerated	per cent. 25	30	24	per cent. 35
" if paper only, not japanned	" 25	30	24	" 35
" snuff, paper	" 25	30	24	" 35
" fancy, not otherwise specified	" 25	30	24	" 35
Brace bitts	" 30	30	24	" 35
Bracelets, gold or set	" 20	30	24	" 25
" gilt	" 25	30	24	" 35
" hair	" 25	30	24	" 35
Brackets	" 30	30	24	" 35
Brads	lb. 5 cts	30	24	M. 2 cts.
Braids, cotton	per cent. 30	25	24	per cent. 25
" in ornaments, for head-dresses	" 30	30	24	" 35
" hair, not made up for head-dresses	" 30	30	24	" 35
" hair, made up for head-dresses	" 25	30	24	" 35
" straw, for making bonnets or hats	" 30	30	24	" 30
Brandy	gal. $1.00	100	30	gal. $1.50 to $2.10
Brass, manufactures of, not otherwise enumerated	per cent. 30	30	24	per cent. 35
" in plates or sheets	" 30	30	24	" 35
" in bars	free,	5	free,	" 15
" in pigs	free,	5	free,	" 15
" old, only fit to be remanufactured	free,	5	free,	" 15
" wire	per cent. 25	30	24	" 35
" rolled	" 30	30	24	" 35
" battery	lb. 12½ cts	30	24	" 35
" studs	per cent. 30	30	24	" 35
" screws	lb. 30 cts	30	24	" 35
Braziers' rods, of 3-16 to 10-16 of an inch diameter	lb. 2½ cts	30	24	
Bricks	per cent. 25	20	15	" 20
Bridles	" 30	30	24	" 35
Brimstone, crude	" 20	15	4	per ton $3.00
" rolled	" 25	20	15	" $6.00
Bristles	lb. 1 ct	5	4	lb. 10 cts.
Bristol stones	per cent. 20	10	4	per cent. 10
" boards	lb. 12½ cts	30	24	" 35
" " perforated	lb. 12½ cts	30	24	" 35
Britannia ware	per cent. 30	30	24	" 35
Bronze casts	" 30	30	24	" 35
" all manufactures of	" 30	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Bronze metal in leaf	per cent. 30	20	15	per cent. 10
" powder	" 20	20	15	" 20
" pale, yellow, white, and red	" 30	20	15	" 20
" liquid, gold, or bronze color	" 20	20	15	" 10
Brooms, all kinds	" 30	30	24	" 35
Brushes of all kinds	" 30	30	24	" 35
Buckram	" 25	20	15	" 30
Bugles, glass, if cut	" 25	40	30	" 35
" glass, if not cut	" 25	30	24	" 30
Building-stones	" 10	10	8	" 20
Bullets	lb. 4 cts	20	15	" 35
Bullrushes	per cent. 20	20	15	" 10
Bullion	free,	free,	free,	free.
Bunting	per cent. 30	25	19	per cent. 35
Burgundy pitch	" 20	25	19	" 20
Burlaps	" 25	20	15	(See Linens.)
Burr stones, unbound	free,	10	free,	free.
" bound up	per cent. 20	10	15	per cent. 20
Busts, lead	lb. 4 cts	30	24	" 35
Butter	lb. 5 cts	20	15	lb. 4 cts.
Button moulds, of whatever material	per cent. 25	25	19	per cent. 30
Buttons, metal, all kinds of	" 30	25	19	" 30
" all other	" 25	25	19	" 30
" with links	" 25	25	19	" 30
Cabinet wares	" 30	30	24	" 35
Cables, tarred	lb. 5 cts	25	19	lb. 2¾ cts.
" manilla, untarred	lb. 4½ cts	25	19	lb. 2¼ cts.
" iron or chain, or parts of	lb. 2½ cts	30	24	lb. 2 cts.
Calomel, and all other mercurial preparations	per cent. 25	25	19	per cent. 30
Camel's hair	" 10	10	8	(See Wool.)
" pencils, in quill	" 20	30	24	per cent. 35
" " other	" 20	30	24	" 35
Camees	" 7	10	4	" 5
" set	" 7	30	24	" 25
Camomile flowers	" 20	20	15	" 20
Camphor, refined	lb. 20 cts	40	30	lb. 40 cts.
" crude	lb. 5 cts	25	8	lb. 30 cts.
Canary seed	per cent. 20	free,	15	bush. $1 00
Candles, tallow	lb. 4 cts	20	15	lb. 2½ cts.
" wax or sperm	lb. 8 cts	20	15	lb. 8 cts.
" other	lb. 8 cts	20	15	lb. 2½ and 5 cts.
Candlesticks, alabaster	various,	40	30	per cent. 35
" glass-cut	lb. 45 cts	40	30	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Candlesticks, spa	various,	40	30	per cent. 35
" all other	"	30	24	" 35
Candy, sugar	lb. 6 cts	30	24	lb. 6 and 10 cts.
Canes, walking, finished or not	per cent. 30	30	24	per cent. 35
Cannon, brass or iron	" 30	30	24	" 35
Canvas, for floor-cloth or wearing-apparel, linen	" 25	20	15	(See Flax.)
Caoutchouc gums	free,	10	4	per cent. 10
Cap wire, covered with silk	lb. 12 cts	30	24	as wire, & 5 cts. p. lb. addition'l
" " cotton thread	lb. 8 cts	30	24	
Caps of chip, lace, leather, cotton, silk, linen, etc	p. ct. 30 a 50	30	24	(chip,) p. ct. 40 (cotton,) p.ct. 35
Caps, gloves, leggins, mitts, socks, stockings, wove-shirts and drawers, and all similar articles made in frames, and worn by men, women, or children, and not otherwise provided for	per cent. 30	20&30	15&24	per cent. 35
Caps, lace, sewed or not	p. ct. 20 a 40	30	24	" 35
Capsules	per cent. 20	30	24	" 40
Carbines or carabines	" 30	30	24	" 35
Carbonate of magnesia	" 20	30	24	lb. 6 cts.
" sal, or brinal of soda	" 20	20	8	lb. ½ ct.
" of ammonia	" 20	20	8	per cent. 20
" of iron	" 20	20	15	" 20
Carboys	each 30 cts	30	24	" 30
Carbuncles	per cent. 10	10	4	" 5
Card cases, of whatever material composed	" 30	30	24	" 35
Cards, playing	pack 25 cts	30	24	pk. 15 and 25 cts.
Carmine, water color	per cent. 20	30	24	per cent. 35
" a liquid dye	" 20		15	" 20
Carpets, Aubusson, Wilton, Saxony, Axminster, Tournay or tapestry velvet, Brussels Jacquard, and medallion	sq. yd. 65 cts	30	24	Under $1.25 p. s. yd. 45 c. p. yd; over, 55 c. p. s. yd.
Carpets, Brussels and Brussels tapestry	yd. 55 cts	30	24	p. sq. yd. 28 cts.
Carpets, treble ingrain, Venetian,	sq. yd. 30 cts	30	24	" 6 cts.
" hemp	per cent. 30	20	15	" 20 cts.
" jute	" 30	20	19	" 20 cts.
" druggets and bockings	sq.yd. 14 cts	25	19	" 20 cts.
" all other	" 30	30	24	various.
" matting	" 25	25	19	per cent. 30
" binding	" 30	25	19	" 35
Carriages of all descriptions, and parts thereof	" 30	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Carriage springs	per cent. 30	30	24	per cent. 35
Carvers	“ 30	30	24	“ 35
Cashmere, borders of wool	“ 40	30	24	lb. 18 cts. & p.ct. 30
“ of Thibet	“ 20	25	19	per cent. 35
“ cloth	“ 40	30	24	(See Wool.)
“ gown patterns, wool being a component material	“ 40	30	24	lb. 18 cts. & p.ct. 30
Cashmere gowns, made	“ 40	30	24	“ “
“ shawls, Thibet	“ 40	30	24	per. cent. 35
“ “ wool being a component part	“ 40	30	24	lb. 18 cts. & p. ct. 35
Casks, empty	“ 30	30	24	per cent. 35
Cassia, Chinese, Calcutta and Sumatra	lb. 5 cts	40	4	lb. 15 cts.
Cassia, buds	per cent. 20	20	4	lb. 20 cts.
Cassimere, woolen	“ 40	30	24	(See Wool.)
“ cotton, wool being a component part, chief value	“ 40	30	24	(See Wool.)
Castings, iron, even if with wrought-iron rings, hoops, handles, etc	lb. 1 & 1½ cts	30	24	per cent. 35
Castor beans	per cent. 20	20	free,	bush. 80 cts.
“ oil	gal. 40 cts	20	15	gal. 50 cts.
Castors, brass, iron or wood	per cent. 30	30	24	per cent. 35
“ or cruets, silver	“ 30	30	24	“ 35
“ “ plated	“ 30	30	24	“ 35
“ “ wood	“ 30	30	24	“ 35
Castor glasses, not in the frames or cruets, cut	gross $2.50	40	30	“ 35
Castor glasses, not in the frames or cruets, not cut	“ $4.00	30	24	“ 30
Catgut	per cent. 15	20	15	“ 30
Catsup	“ 30	30	24	“ 40
Caustic	“ 20	30	24	“ 20
Cement, Roman	“ 20	20	15	“ 20
Chafing dishes	“ 30	30	24	“ 35
Chains, all	lb. 2½ & 4 cts	30	24	Chain cables, lb. 2c.; chain curbs, gilt, p. ct. 35; chains, ½ in. or over in diam. lb. 1½ cts.; under ½ in. & not under ¼, 2¼ cts.; under ¼ in. & not under No.9 wire, 3 cts.; under No. 9, 30 p. ct.; coated with zinc, etc., 2¼ c. per lb.; of other metal than iron, 35 p. ct.
Chairs, sitting	per cent. 30	30	24	per cent. 35
Chalk, red	“ 20	20	4	“ 10
“ red, pencils	“ 25	30	24	“ 30

	1842.	1846. per ct.	1857. per ct.	1862.
Chalk, French	per cent. 20	20	4	per cent. 10
" white	free,	5		ton, $4.00.
Chambray gauze, cotton, as cotton,	per cent. 30	25	24	(as cotton.)
" if wool is a component part	" 40	30	24	(See Silk.)
" of silk only	lb. $2.50	25	19	per cent. 40
Chandeliers, brass	per cent. 30	30	24	" 35
" glass, cut	lb. 45 cts	40	30	" 35
Charts	free,	10	free,	" 20
" books	per cent. 20	10	8	" 20
Checks, cotton	" 40	25	24	(as cotton.)
" princess, wool	" 40	30	24	(See Wool.)
" " worsted	" 40	25	19	lb. 2 cts. & p. ct. 30
" linen	" 25	20	15	as Linens.
Cheese	lb. 9 cts	30	24	lb. 4 cts.
Chemical preparations, not otherwise enumerated	per cent. 20	30	24	per cent. 20
Chenille, cords or trimming of, cotton	" 30	30	24	" 35
Chessmen, bone, ivory, rice or wood	" 30	30	24	" 35
Chicory root	free,	free,	free,	lb. 2 cts.
" ground	per cent. 20	20	15	lb. 3 cts.
China ware	" 30	30	24	per cent, 35; ornamented, 40.
" root	" 20	20	15	per cent. 20
Chip hats or bonnets	" 35	30	24	" 40
Chisels, all	" 30	30	24	" 35
Chloride of lime	lb. 1 ct	10	4	100 lbs. 30 cts.
Chocolate	lb. 4 cts	20	15	lb. 7 cts.
Chromate of potash	per cent. 20	20	15	lb. 3 cts.
" lead	lb. 4 cts	20	15	per cent. 25
Chromic, yellow	per cent. 20	20	15	" 25
" acid	" 20	20	15	" 15
Chronometers and parts	" 20	10	8	" 10
Cinchona, Peruvian	free,	15	free,	" 20
Cinnabar	" 20	25	15	" 20
Cinnamon	lb. 25 cts	30	4	lb. 25 cts.
Citron, in its natural state	free,	20	8	per cent. 10
" preserved	per cent. 25	40	30	" 35
Clasps, all	" 30	30	24	" 35
Clay, ground or prepared	" 20	20	15	" 20
" unwrought	free,	5	4	ton, $5.00
Clayed sugar, white	lb. 4 cts	30	24	lb. 4 cts.
Cloaks, of wool	per cent. 50	30	24	(See Wool.)
Clocks	" 25	30	24	per cent. 35
Cloth, India rubber	" 30	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Cloth, woolen	per cent. 40	30	24	(See Wool.)
" oil, 50 cts or less	yd. 35 cts	30	24	per cent. 30
" " over 50 cts	" 35 cts	30	24	" 35
" hemp	per cent. 20	20	15	" 25
Clothing, ready-made	" 50	30	24	" 35
" of wool	" 50	30	24	lb. 18 c. & p. c. 30
Cloves	lb. 8 cts	40	4	lb. 15 cts.
Coaches, or parts thereof	per cent. 30	30	24	per cent. 35
Coach furniture of all descriptions,	" 30	30	24	" 35
Coal, bituminous	ton, $1.75	30	24	ton $1.10 (28 bus.)
" other	" $1.75	30	24	" 60 cts.
Coal-hods	per cent. 30	30	24	per cent. 35
Coatings, mohair or goats' hair	" 20	25	19	" 85
Cobalt	" 20	20	15	" 20
Cochineal	free,	10	4	free.
Cocks	per cent. 30	30	24	per cent. 35
Cocoa	lb. 1 ct	10	4	lb. 3 cts.
" shells	per cent. 20	10	4	lb. 2 cts.
Cocoa-nuts, West Indies	free,	20	4	free.
Codfish, dry	cwt. $1.00	20	15	lb. ½ ct.
Coffee, when imported in American vessels from the place of its growth	free,	free,	free,	lb. 5 cts.
Coffee, the growth or production of the possessions of the Netherlands, imported from the Netherlands	free,	free,	free,	lb. 5 cts.
Coffee, all other	per cent. 20	20	15	lb. 5 cts.
Coffee-mills	" 30	30	24	per cent. 35
Coins, cabinets of	free,	free,	free,	free.
Coke	bush. 5 cts	30	24	per cent. 30
Cold cream	per cent. 25	30	24	" 50
Cologne water	" 25	30	24	" 50
Colors, water	" 25	30	24	" 35
Combs	" 25	30	24	" 35
Comforters, made of wool	" 40	30	24	(See Wool.)
Comfits, preserved in sugar, brandy, or molasses	" 25	40	30	" 35
Commode handles	" 30	30	24	" 35
" knobs	" 30	30	24	" 35
Compasses	" 30	30	24	" 35
Composition of glass or paste, set,	" 20	30	24	" 35
" " " not set,	" 10	10	8	" 10
Coney wool	" 25	10	8	
Confectionary, all, not otherwise provided for	" 25	30	24	lb. 10 cts.
Copperas	lb. 2 cts	20	15	lb. ½ ct.

	1842.	1846. per ct.	1857. per ct.	1862.
Copper bottoms	per cent. 30	20	15	per cent. 30
Copper, braziers'	" 30	20	15	" 30
Copper plates and sheets, other	lb. 2 cts	30	24	
Copper, for the use of the mint	free,	free,	free,	free.
" in pigs, bars	free,	5	free,	lb. 2 cts.
" old, fit only to be re-manufactured	free,	5	free,	lb. 1½ cts.
" manufactures of, not otherwise specified	per cent. 30	30	24	per cent. 35
" ore	free,	free,	free,	per cent. 5
" rods, bolts, spikes & nails,	lb. 4 cts	20	15	" 30
Copper, sheathing for ships, when 14 inches wide and 48 inches long, and weighing from 14 to 34 ozs. per square foot	free,	free,	free,	lb. 2 cts.
Copper, sulphate of	lb. 2 cts	20	15	per cent. 20
Coral	per cent. 20	20	15	free.
" cut or manufactured	" 20	30	24	per cent. 30
Cordage, tarred	lb. 5 cts	25	19	lb. 2¾ cts.
" untarred	lb. 4½ cts	25	19	lb. 3½ cts.
" manilla	lb. 4½ cts	25	19	lb. 2¼ cts.
Cordials, all kinds	gal. 60 cts	100	30	gal. 75 cts.
Cork, manufactures of	per cent. 25	30	24	per cent. 35
Corks	" 30	30	24	" 50
Cork-tree, bark of, unmanufactur'd	free,	15	4	" 30
Corn, Indian, or maize	bush. 10 cts	20	15	bush. 10 cts.
" meal		20	15	per cent. 10
Corsets	per cent. 50	30	24	" 35
Cosmetics	" 25	30	24	" 50
Cotton	lb. 3 cts	free,	free,	lb. ½ ct.
Cotton, unbleach'd, 100 thr'ds sq. in. or less, and over 5 oz. p. yd.	per cent. 30	25	24	sq. yd. 1¼ cts.
100@140 thr'ds, not 5 oz.	" 30	25	24	" 2½ cts.
140@200 thr'ds, "	" 30	25	24	" 3¾ cts.
over 200 thr'ds, "	" 30	25	24	" 5 cts.
" bleached, 100 thr'ds sq. in. or less, and over 5 oz.	" 30	25	24	" 1¾ cts.
100@140 thr'ds, not 5 oz.	" 30	25	24	" 3 cts.
140@200 thr'ds, "	" 30	25	24	" 4¼ cts.
over 200 thr'ds, "	" 30	25	24	" 5½ cts.
" colored, 100 thr'ds sq. inch or less, and over 5 oz.	" 30	25	24	s.y. 2½ c. & p.ct. 10
100@140 thr'ds, not 5 oz.	" 30	25	24	" 3½ c. " 10
140@200 thr'ds, "	" 30	25	24	" 4½ c. " 10
over 200 thr'ds, "	" 30	25	24	" 5½ c. " 10
" other plain woven, costing over 16 cts. sq. yd	" 30	25	24	" 30

	1842.	1846. per ct.	1857. per ct.	1862.
Cotton, all manufactures of, not otherwise enumerated	per cent. 30	25	24	per cent. 35
Cotton bagging, 10 cts. lb. or less,	sq. yd. 4 cts	25	15	lb. 2¼ cts.
" " over 10 cts. lb.	" 4 cts	25	15	lb. 3 cts.
" braces, or suspenders	per cent. 30	30	24	per cent. 35
" caps, gloves, leggins, mitts, socks, stockings, wove-shirts, and drawers	" 30	20	15&24	" 35
Cotton embroidery, or floss	" 25	25	24	" 35
" hosiery, unbleached	" 30	20	15	" 35
" lace, including bobbinet	" 20	25	24	" 25
" laces, insertings, trimmings and braids	" 30	25	24	" 25
" spool and other thread	" 30	25	24	" 40
" twist, yarn, and thread, all other on spools or otherwise	" 30	25	24	" 40
Counters	" 20	30	24	" 35
Court-plaster	" 30	30	24	" 35
Cranks, mill, of wrought iron	lb. 4 cts	30	24	lb. 1¾ cts.
Crapes, silk	lb. $2.50	25	19	per cent. 40
Crash, 30 cts. or less	per cent. 25	20	15	" 35
" over 30 cts.	" 25	20	15	" 35
Cravats	" 50	30	24	per cent. 35 & 40
Crayons	" 25	30	24	" 30
Crayon pencils	" 25	30	24	" 30
Cream of tartar	free,	20	4	lb. 10 cts.
Crockery	per cent. 30	30	24	per cent. 35
Crucibles, all	p.ct. 20 & 30	30	24	" 30
Cubebs	" 20	20	15	lb. 10 cts.
Cudbear	" 10	10	4	per cent. 10
Cupboard turns	" 30	30	24	" 35
Currants	lb. 3 cts	40	8	lb. 5 cts.
Curtain rings	per cent. 30	30	24	per cent. 35
Cutch	" 10	10	free,	" 10
Cutlasses	" 30	30	24	" 35
Cutlery, all kinds	" 30	30	24	" 85
Daggers and dirks	" 30	30	24	" 35
Dates	lb. 1 ct	40	8	lb. 2 cts.
Decanters, cut	lb. 25 to 45 c	40	30	per cent. 35
" plain	lb. 14 cts	30	24	" 30
Delaines, gray	per cent. 40	30	24	" 30
" colored	" 40	30	24	p. c. 30 & s. y. 2c. val. above 40c. per s. y. 35 p. ct.
Demijohns	ea. 15 to 50c	30	24	per cent. 35
Dentifrice	" 20	30	24	" 50

	1842.	1846. per ct.	1857. per ct.	1862.
Diamonds	“ 7½	10	4	“ 5
“ set	“ 7½	30	24	“ 25
“ glaziers	“ 25	15	12	“ 10
Diaper, linen	“ 25	20	15	(See Linens.)
“ “	“ 25	20	15	“
Diapers, cotton	“ 30	25	24	(See Cotton.)
Dice, ivory or bone	“ 20	30	24	per cent. 35
Dimities and dimity muslin	“ 30	25	24	(See Cotton.)
Distilled vinegar, medicinal	gal. 8 cts	30	24	per cent. 40
Dolls, of every description	per cent. 30	30	24	“ 35
Down, all kinds	“ 25	25	19	“ 30
Drawer-knobs of any material	“ 30	30	24	“ 35
“ “ entirely of cut-glass	lb. 45 cts	40	30	“ 35
“ “ “ plain do.	per cent. 25	30	24	“ 30
Drawers, Guernsey, wool or worsted	“ 30	30	24	(See Wool.)
Drawers, knit, without needle-work	“ 30	30	24	“ 35
Drawers, silk, wove	“ 40	30	24	“ 35
“ cotton, wove	“ 30	20.	15&24	“ 30
Drawing-knives	“ 30	30	24	“ 35
“ pencils	“ 25	30	24	gross, $1.00.
Drawings	“ 20	20	8	per cent. 20
Drillings, linen	“ 25	20	15	
“ if cotton be a component material, subject to the regulations respecting cotton cloths	“ 30	25	19	“ 35
Drugs, dyeing, not otherwise enumerated	“ 20	20	4	“ 20
“ dyeing or tanning, in a crude state	free,	20	free,	free.
“ medicinal, not otherwise enumerated, in a crude state,	per cent. 20	20	15	per cent. 20
Dutch metal, in leaf	“ 25	20	15	“ 10
Dyeing articles, crude	“ 20	20	free,	free.
Dyeing drugs, and materials for composing dyes, crude, not otherwise enumerated	“ 20	20	free,	free.
Earth, in oil	lb. 1½ cts	30	24	100 lbs. 1½
“ brown, red, blue, yellow, dry, as ochre	lb. 1 ct	30	15	100 lbs. 50 cts.
Earthenware	per cent. 30	30	24	per cent. 20 & 35
Ebony, manufact’res of, or of which it is the material of chief value,	“ 30	40	30	“ 35
Elastic garters	“ 30	30	24	“ 35

	1842.	1846. per ct.	1857. per ct.	1862.
Embroideries, all in gold or silver, fine, or half fine, or other metal,	per cent. 20	30	24	per cent. 35
Embroidery, if done by hand	" 30	30	24	" 35
Emeralds	" 7	10	4	" 5
Emery	free,	20	8	lb. 1 ct.
" cloth, cotton	per cent. 30	25	24	" 35
Emetic, tartar, medicinal	" 20	30	24	lb. 15 cts.
Engravings, books of, bound or not,	" 20	10	8	per cent. 20
Epaulettes, all	p.ct.25 & 30.	25&30	24	" 35
" gold	free.			
Epsom salts	per cent. 20	20	15	lb. 1 ct.
Essence, all	" 25	30	24	from 25 c. per lb. to $2 per oz. and others 50 p. ct.
Etchings or engravings	" 20	10	8	per cent. 20
Ether	per cent. 20	20	15	" 20
" sulphuric	" 20	20	15	" 20
Extract of belladonna	" 25	30	24	" 40
" Campeachy wood	" 20	20	4	" 10
" cicuta	" 25	30	24	" 40
" colocynth	" 25	30	24	" 40
" elaterium	" 25	30	24	" 40
" gentian	" 25	30	24	" 40
" hyosciamus	" 25	30	24	" 40
" indigo	" 20	20	4	" 10
" logwood	" 20	20	4	" 10
" madder	" 20	20	4	" 10
" nux vomica	" 25	30	24	" 40
" opium	" 25	30	24	" 40
" rhatania	" 25	30	24	" 40
" rhubarb	" 25	30	24	" 40
" stramonium	" 25	30	24	" 40
Extracts and decoctions of dye-woods, not otherwise provided for	" 20	20	4	" 10
Extracts, all other	" 25	30	24	" 40
Fans, all	" 25	30	24	" 35
Fastenings, shutter or other, of copper, iron, steel, brass, gilt, plated or japanned	" 30	30	24	" 35
Feathers, ornamental	" 25	30	24	" 40
" for beds	" 25	25	19	" 30
" vultures', for dusters	" 25	30	24	" 40
Fiddles	" 30	20	15	" 30
Fifes, bone, ivory, or wood	" 30	20	15	" 30
Figs	lb. 2 cts	40	8	lb. 5 cts.

	1842.	1846. per ct.	1857. per ct.	1862.
Garters, India-rubber, with clasps and of wire	per cent. 30	30	24	per cent. 35
Gelatine	" 30	30	24	" 35
Gems	" 7	10	4	" 5
Gems, set	per cent. 30	30	24	" 25
German silver, manufactured or not	" 30	30	24	" 35
Gilt fancy wares, jewelry, wire, etc.	" 25	30	24	" 35
Gimlets	" 30	30	24	" 35
Gimps, cotton	" 30	30	24	" 35
" silk	lb. $2.50	25	19	" 40
" thread, linen	per cent. 30	20	15	" 35
" wire being a component part, of chief value	" 30	30	24	" 35
Gin	gal. 60@90c	100	30	gal. $1.00 to $1.40
Ginger, green, ripe, or dried	lb. 2 cts	40	15	lb. 5 cts.
" ground	lb. 4 cts	30	24	lb. 8 cts.
" preserved or pickled	per cent. 25	40	15	per cent. 40
Ginseng	" 20	20	15	" 20
Glass, all articles not specified	" 30	30	24	" 30
" crown, plate, polished, or other window—				
not over 10×15	2 to 12 cts. pr. sq. ft.	20	15	sq. ft. 3 cts.
" 16×24		20	15	" 5 cts.
" 24×30		20	15	" 8 cts.
over 1⅛ lb. per sq. ft. on exc.		20	15	" 8 cts.
" apothecaries' vials, 16 oz.	gross $2.25	30	24	per cent. 30
" bottles, black	various,	30	24	" 30
" broken		20	free,	free.
" buttons, cut, entirely of	lb. 35 cts	25	19	per cent. 30
" colored	per cent. 30	30	24	" 35
" cut, engraved, colored, etc.		40	30	" 35
" disks, optical	lb. 45 cts	30	24	" 10
" green, pocket bottles	various,	30	24	" 30
" looking, plates, silvered	"	30	24	sq. ft. 4 to 60 cts.
" manufactures of, all vessels or wares, of cut glass	lb. 25 a 45 cts	40	30	per cent. 35
" manufactures of, all others not specially mentioned	per cent. 25	30	24	" 30
" of antimony	" 30	30	15	" 20
" paintings on	" 30	30	24	" 35
" pressed, plain or mould, not cut, colored or engraved	lb. 10 a 14 cts	30	24	" 30
" rough plate, cylinder,				
not over 10×15	lb. 2 to 6 cts.	20	15	sq. ft. ¾ ct.
" 16×24		20	15	" 1 ct.
" 24×30		20	15	" 1⅛ ct.

	1842.	1846. per ct.	1857. per ct.	1862.
Glass, rough plate, cylinder, not over 24×30, and not over 1 lb. per sq. ft.		20	15	sq. ft. 2 cts.
over 1 lb. per sq. ft. pays an additional duty on the excess at the same rates.				
Glasses, hour	per cent. 25	30	24	per cent. 35
Glauber salts	" 20	20	15	lb. ⅛ ct.
Glaziers' diamonds	" 25	15	12	per cent. 10
Globes	" 30	30	24	" 35
Gloves	doz. 50 cts. to $1.50 & p.ct. 30	20&30	24	per cent. 35 to 40
" hair	per cent. 25	30	19	per cent. 30
Glue, all	lb. 5 cts	20	15	" 20
Goats' skins, raw	per cent. 5	10	4	" 10
" " tanned	doz. $1.00	20	15	" 25
Gold, all articles composed of	per cent. 30	30	24	" 35
Gold leaf	" 20	15	12	500 leaves, $1.50
" beaters' brine	" 20	20	15	free.
" " moulds	" 10	10	8	per cent. 10
" " skins	" 10	10	8	" 10
" dust	free,	free,	free,	free.
" embroideries	per cent. 30	30	24	per cent. 35
" muriate of	" 25	20	15	" 20
" oxide of	" 25	20	15	" 20
" paper, in sheets, strips, or other forms	lb. 12½ cts	30	24	" 35
" shell for painting	" 20	30	24	" 35
" size	" 20	20	15	" 20
" studs	" 20	30	24	" 25
Grapes, not dried	" 20	30	8	" 20
Grass bags	sq. yd. 5 cts	30	24	" 35
" flats, braids, or plaits	per cent. 35	30	24	" 30
" hats or bonnets	" 35	30	24	" 40
" Sisal	ton $25	25	19	ton $15.
Grease	per cent. 10	10	8	per cent. 10
Green turtle	" 20	20	15	" 20
Gridirons	" 30	30	24	" 35
Grindstones	free,	5	4	" 20
" unfinished	free,	5	4	" 10
Gunny bags	sq. yd. 5 cts	20	15	" 25
Guano	free,	free,	free,	free.
" imitation of	free,	20	free,	free.
Guitars	per cent. 30	20	15	per cent. 30
Guitar strings, gut	" 15	20	15	" 30
Gum Benzoin, or Benjamin	" 15	30	8	lb. 10 cts.

	1842.	1846. per ct.	1857. per ct.	1862.
Gum copal	per cent. 15	10	8	lb. 10 cts.
“ elastic articles	“ 30	30	24	per cent. 35
“ Senegal, Arabic, and Tragacanth	free,	10	8	“ 10
“ all, and all other resinous substances not specified, in a crude state	per cent. 15	20	8&15	“ 20
Gum, substitute, burnt flour and starch	“ 15	10	8	per cent. 20
Gums, medicinal, in a crude state,	“ 15	20	15	“ 20
Gun locks	“ 30	30	24	“ 35
Gunpowder	lb. 8 cts	20	15	less than 20 cts. 6 cts. p. lb.; over 20 cts. 6 cts. per lb. & 20 per ct.
Guns (except muskets and rifles),	per cent. 30	30	24	per cent. 35
Guts, sheeps', salted	“ 20	20	15	“ 20
Gutta percha, unmanufactured		20	4	“ 10
Gypsum, or plaster of Paris	free,	free,	free,	free.
Hair, Angora goats', raw, 18 cts. or less	lb. 1 ct	20	15	per cent. 5
“ do. do. over 18 cts.,	lb. 1 ct	20	15	lb. 3 cts.
“ all manufactures of goats' or mohair	per cent. 20	25	19	per cent. 30
“ bracelets, chains, ringlets, and curls	“ 25	30	24	“ 35
“ braids, for the head	“ 25	30	24	“ 35
“ cloth	“ 25	25	19	“ 30
“ curled, for beds	“ 20	20	15	“ 20
“ for head-dresses	“ 25	30	24	“ 35
“ gloves	“ 25	25	19	“ 30
“ nets	“ 25	30	24	“ 40
“ pencils	“ 20	30	24	“ 35
“ pins	“ 30	30	24	“ 35
“ powder, not perfumed	“ 20	30	24	“ 50
“ powder, perfumed, all others not specified	“ 20	30	24	“ 50
“ seating	“ 25	25	19	“ 30
“ unmanufactured	“ 10	10	8	per cent. 30
“ human, uncleaned	“ 10	10	8	“ 20
Hames, wood	“ 35	30	24	per cent. 35
Hammers, not blacksmiths'	“ 30	30	24	“ 35
Hams, bacon	lb. 3 cts	20	15	lb. 2 cts.
Handles for chests	per cent. 30	30	24	per cent. 35
Hangings, paper	“ 35	20	15	“ 35
Hare skins, undressed	“ 5	10	8	“ 10

	1842.	1846. per ct.	1857. per ct.	1862.
Hare skins, dressed	per cent. 20	20	15	“ 15
Harlaem oil	“ 20	30	24	“ 50
Harness	“ 35	30	24	“ 35
“ furniture	“ 35	30	various	“ 35
Harps and harpsichords	“ 30	20	15	“ 30
Hartshorn	“ 20	20	15	“ 40
Hatchets	“ 30	30	24	“ 35
Hat felts, or bodies, of wool, not put in form or trimmed	each 18 cts	20	15	per cent. 25
Hat bodies, cotton	per cent. 30	30	24	“ 35
Hats, Leghorn	“ 35	30	24	“ 40
“ of chip, straw, or grass	“ 35	30	24	“ 40
“ of wool	each 18 cts	20	15	“ 30
“ all other	per cent. 35	30	24	“ 40
Hautboys	“ 30	20	15	“ 30
Haversacks, of leather	“ 35	30	24	“ 35
Hayknives	“ 30	30	24	“ 35
Head-dresses, ornaments for	“ 30	30	24	“ 35
Hemlock	“ 20	20	15	“ 20
Hemp, all manufactures of, not otherwise specified	“ 20	20	15	per cent. 30 to 35
Hemp, a component part	“ 20	20	15	per cent. 35
“ Manilla	ton $25	25	19	ton, $25.
“ seed	per cent. 20	10	8	lb. ½ ct.
“ unmanufactured	ton $40	30	24	ton $40.
Henbane	per cent. 25	20	15	per cent. 20
Herrings	bbl. $1.50	20	15	bbl. $1.
Hides, raw and salted	per cent. 5	5	4	per cent. 10
“ tanned	“ 20	20	15	“ 35
Hobby-horses	“ 30	30	24	“ 35
Hods	“ 30	30	24	“ 35
Hoes	“ 30	30	24	“ 35
Hollow-ware, tinned	lb. 2½ cts	30	24	lb. 8 cts.
Hones	“ 20	20	15	per cent. 20
Honey	“ 20	30	24	gal. 15 cts.
Hooks, all	“ 30	30	24	per cent. 35
Hooks and eyes	“ 30	30	24	“ 35
Hops	“ 20	20	15	lb. 5 cts.
Horn combs	“ 20	30	24	per cent. 35
“ plates for lanterns	“ 20	30	24	“ 35
“ tips	“ 5	5	4	“ 10
Horns	“ 5	5	4	“ 10
Household furniture	“ 30	30	24	“ 35
“ “ of cedar, granadilla, ebony, mahogany, rose, and satin wood	“ 30	40	30	“ 35
Hydrometers, of glass	“ 25	30	24	“ 35

	1842.	1846. per ct.	1857. per ct.	1862.
Ice	free,	20	free,	free.
Imitation of precious stones	per cent. 7	10	8	per cent. 5
Implements of trade of persons arriving in the United States	free,	free,	free,	free.
India grass	ton $25	25	19	ton, $25.
" rubber, unmanufactured	free,	10	4	per cent. 10
India rubber, boots and shoes	per cent. 30	30	24	per cent. 35
" " other manufactures of India rubber	" 30	30	24	" 35
" " milk of	free,	10	4	" 20
" " suspenders	" 30	30	24	" 35
" " webbing	" 30	30	24	" 35
Indian meal	112 lbs. 20 c	20	15	" 10
Indigo	lb. 5 cts	10	4	free.
Ink	per cent. 25	30	24	per cent. 35
Ink-powder	" 25	30	24	" 35
Ink-stands, glass cut	various,	40	30	" 35
" all other	"	30	24	" 35
Instruments, philosophical	"	30	24	" 40
" " specially imported	free,	free,	free,	free.
Inventions, model of	free,	free,	free,	free.
Iodine	per cent. 20	20	15	lb. 50 cts.
" salts of	" 20	20	15	per cent. 20
Ipecac, or ipecacuanha	" 20	20	15	lb. 50 cts.
Iridium	" 20	20	15	free.
Iron, anchors	lb. 2½ cts	30	24	lb. 2 cts.
" anvils	lb. 2½ cts	30	24	lb. 2¼ cts.
" axles	lb. 4 cts	30	24	lb. 2½ cts.
" malleable iron in castings	lb. 4 cts	30	24	lb. 2 cts.
" band, hoop, and slit rods, all other	lb. 2½ cts	30	24	ton $25.
" bars, flat—1@7 in. wide, and ¼@2 in. thick (not less than 20 per cent.)	ton $25	30	24	ton $17.
" bars, round, ½@4 in. diam. do.	" 25	30	24	" $17.
" " square, ½@4 in. sq're do.	" 25	30	24	" $17.
" bed screws and wrought hinges	per cent. 30	30	24	lb. 1¾ cts.
" blacksmith hamm. & sledges,	lb. 2½ cts	30	24	lb. 2½ cts.
" boiler plates	lb. 2½ cts	30	24	ton $25.
" cables, chains, and parts	lb. 4 cts	30	24	lb. 2 cts.
" cast-iron vessels, sads, tailors' & hatters', stoves, and stove-plates	lb. 1½ cts	30	24	lb. 1¼ cts.
" cast-iron pipe, steam, gas and water	lb. 1½ cts	30	24	lb. ¾ ct.

	1842.	1846. per ct.	1857. per ct.	1862.
Iron, cast-iron butts and hinges	lb. 2½ cts.	30	24	lb. 2 cts.
" castings, all other	lb. 1 ct.	30	24	per cent. 30
" chains, trace, halter & fence of rod over ½ in.	lb. 4 cts.	30	24	lb. 1¾ cts.
" do. do. ¼@½ in.	lb. 4 cts.	30	24	lb. 2¼ cts.
" do. do. No. 9@¼ in.	lb. 4 cts.	30	24	lb. 3 cts.
" do. do. less than No. 9.	lb. 4 cts.	30	24	per cent. 30
" cut tacks, brads, and sprigs, not over 16 oz. per M.	M. 5 cts.	30	24	M. 2 cts.
" do. do. over 16 oz. per M.	M. 5 cts.	30	24	lb. 2 cts.
" galvanised or zinc-coated	per cent. 30	30	24	lb. 2½ cts.
" hollow-ware, glazed or tinned	lb. 2½ cts.	30	24	lb. 3 cts.
" liquor	per cent. 30	20	15	per cent. 10
" nails and spikes, cut	lb. 3 cts.	30	24	lb. 1¼ cts.
" nails, spikes, rivets, and bolts, wrought	lb. 4 cts.	30	24	lb. 2¼ cts.
" nails, horseshoe	lb. 4 cts.	30	24	lb. 4½ cts.
" other, rolled and hammered,	ton $25	30	24	
" pig (not less than 20 per ct.)	ton $9	30	24	ton $6.
" railroad, not over 6 in. high (not less than 20 p. c.)	ton $25	30	24	ton $13.50.
" sheet, smooth or polished	lb. 2½ cts.	30	24	lb. 2½ cts.
" sheet, all other not thinner than No. 20 wire	lb. 2½ cts.	30	24	ton $23.
" sheet, No. 20@25	lb. 2½ cts.	30	24	ton $29.
" " thinner than No. 25	lb. 2½ cts.	30	24	ton $35.
" slabs, blooms, loops, and more wrought than pig, and less than bars	ton $17	30	24	ton $17.
" taggers' iron	per cent. 5	30	24	per cent. 10
" wood screws, 2 in. or less	lb. 12 cts.	30	24	lb. 9½ cts.
" " " over 2 in.	lb. 12 cts.	30	24	lb. 6½ cts.
" " " wash'd or plat.	per cent. 30	30	24	
" wrought for mill, mill-cranks, ships, locomotives, steam-engines, or parts, not less than 25 lbs	lb. 4 cts.	30	24	lb. 1¾ cts.
" wrought railroad chairs, nuts, & punched washers,	lb. 2½ cts.	30	24	ton $30.
" wrought tubes, steam, gas, and water	lb. 5 cts.	30	24	lb. 2¼ cts.
" all other manufactures	per cent. 30	30	24	per cent. 35
Isinglass	" 20	30	24	" 30
Ivory	free,	5	free,	" 10
" black	lb. ¾ ct.	20	free,	" 20
" manufactures of	per cent. 20	30	24	" 35
" nuts	free,	5	free,	" 10

	1842.	1846. per ct.	1857. per ct.	1862.
Ice	free,	20	free,	free.
Imitation of precious stones	per cent. 7	10	8	per cent. 5
Implements of trade of persons arriving in the United States	free,	free,	free,	free.
India grass	ton $25	25	19	ton, $25.
" rubber, unmanufactured	free,	10	4	per cent. 10
India rubber, boots and shoes	per cent. 30	30	24	per cent. 35
" " other manufactures of India rubber	" 30	30	24	" 35
" " milk of	free,	10	4	" 20
" " suspenders	" 30	30	24	" 35
" " webbing	" 30	30	24	" 35
Indian meal	112 lbs. 20 c	20	15	" 10
Indigo	lb. 5 cts	10	4	free.
Ink	per cent. 25	30	24	per cent. 35
Ink-powder	" 25	30	24	" 35
Ink-stands, glass cut	various,	40	30	" 35
" all other	"	30	24	" 35
Instruments, philosophical	"	30	24	" 40
" " specially imported	free,	free,	free,	free.
Inventions, model of	free,	free,	free,	free.
Iodine	per cent. 20	20	15	lb. 50 cts.
" salts of	" 20	20	15	per cent. 20
Ipecac, or ipecacuanha	" 20	20	15	lb. 50 cts.
Iridium	" 20	20	15	free.
Iron, anchors	lb. 2½ cts	30	24	lb. 2 cts.
" anvils	lb. 2½ cts	30	24	lb. 2¼ cts.
" axles	lb. 4 cts	30	24	lb. 2½ cts.
" malleable iron in castings	lb. 4 cts	30	24	lb. 2 cts.
" band, hoop, and slit rods, all other	lb. 2½ cts	30	24	ton $25.
" bars, flat—1@7 in. wide, and ¼@2 in. thick (not less than 20 per cent.)	ton $25	30	24	ton $17.
" bars, round, ¼@4 in. diam. do.	" 25	30	24	" $17.
" " square, ¼@4 in. sq're do.	" 25	30	24	" $17.
" bed screws and wrought hinges	per cent. 30	30	24	lb. 1¾ cts.
" blacksmith hamm. & sledges,	lb. 2½ cts	30	24	lb. 2½ cts.
" boiler plates	lb. 2½ cts	30	24	ton $25.
" cables, chains, and parts	lb. 4 cts	30	24	lb. 2 cts.
" cast-iron vessels, sads, tailors' & hatters', stoves, and stove-plates	lb. 1½ cts	30	24	lb. 1¼ cts.
' cast-iron pipe, steam, gas and water	lb. 1½ cts	30	24	lb. ¾ ct.

	1842.	1846. per ct.	1857. per ct.	1862.
Iron, cast-iron butts and hinges	lb. 2½ cts	30	24	lb. 2 cts.
" castings, all other	lb. 1 ct	30	24	per cent. 30
" chains, trace, halter & fence of rod over ½ in	lb. 4 cts	30	24	lb. 1¾ cts.
" do. do. ¼@½ in	lb. 4 cts	30	24	lb. 2¼ cts.
" do. do. No. 9@¼ in	lb. 4 cts	30	24	lb. 3 cts.
" do. do. less than No. 9	lb. 4 cts	30	24	per cent. 30
" cut tacks, brads, and sprigs, not over 16 oz. per M	M. 5 cts	30	24	M. 2 cts.
" do. do. over 16 oz. per M.	M. 5 cts	30	24	lb. 2 cts.
" galvanized or zinc-coated	per cent. 30	30	24	lb. 2¼ cts.
" hollow-ware, glazed or tinned	lb. 2½ cts	30	24	lb. 3 cts.
" liquor	per cent. 30	20	15	per cent. 10
" nails and spikes, cut	lb. 3 cts	30	24	lb. 1¼ cts.
" nails, spikes, rivets, and bolts, wrought	lb. 4 cts	30	24	lb. 2¼ cts.
" nails, horseshoe	lb. 4 cts	30	24	lb. 4½ cts.
" other, rolled and hammered,	ton $25	30	24	
" pig (not less than 20 per ct.)	ton $9	30	24	ton $6.
" railroad, not over 6 in. high (not less than 20 p. c.)	ton $25	30	24	ton $13.50.
" sheet, smooth or polished	lb. 2½ cts	30	24	lb. 2½ cts.
" sheet, all other not thinner than No. 20 wire	lb. 2½ cts	30	24	ton $23.
" sheet, No. 20@25	lb. 2½ cts	30	24	ton $29.
" " thinner than No. 25	lb. 2½ cts	30	24	ton $35.
" slabs, blooms, loops, and more wrought than pig, and less than bars	ton $17	30	24	ton $17.
" taggers' iron	per cent. 5	30	24	per cent. 10
" wood screws, 2 in. or less	lb. 12 cts	30	24	lb. 9½ cts.
" " " over 2 in	lb. 12 cts	30	24	lb. 6½ cts.
" " " wash'd or plat.	per cent. 30	30	24	
" wrought for mill, mill-cranks, ships, locomotives, steam-engines, or parts, not less than 25 lbs	lb. 4 cts	30	24	lb. 1¾ cts.
" wrought railroad chairs, nuts, & punched washers,	lb. 2½ cts	30	24	ton $30.
" wrought tubes, steam, gas, and water	lb. 5 cts	30	24	lb. 2¼ cts.
" all other manufactures	per cent. 30	30	24	per cent. 35
Isinglass	" 20	30	24	" 30
Ivory	free,	5	free,	" 10
" black	lb. ¾ ct	20	free,	" 20
" manufactures of	per cent. 20	30	24	" 35
" nuts	free,	5	free,	" 10

	1842.	1846. per ct.	1857. per ct.	1862.
Ivory, vegetable, manufactures of.	per cent. 20	30	24	per cent. 35
Jacks for piano-fortes	" 30	20	24	" 35
" clothiers'	" 30	30	24	" 35
Jalap	" 20	20	15	lb. 50 cts.
Japanned wares, of all kinds	" 30	30	24	per cent. 40
Jellies, and all similar preparations	" 30	30	24	" 35
Jerk-beef	lb. 2 cts	20	15	lb. 1 ct.
Jet, real or composition	per cent. 20	30	24	per cent. 35
Jewelry	" 20	30	24	" 25
" false, so called	" 25	30	24	" 25
Juniper berries	" 20	20	15	" 10
" plants	" 20	free,	free,	" 30
Junk, old	free,	free,	free,	free.
Jute	ton $25	25	19	ton $15.
" carpeting	per cent. 30	25	15	sq. yd. 6 cts.
" butts	" 25	20	15	ton $6.
Kaleidoscopes	" 30	30	24	per cent. 35
Kerseys	" 40	30	24	under $1 per sq. yd. lb. 18 c. & 30 p. ct.; over, lb. 18 cts. & 35 p. ct.
Kerseymere	" 40	30	24	
Kettles, brass, in nests	" 30	30	24	per cent. 35
" cast-iron	lb. 1½ cts	30	24	lb. 1½ cts.; copper 35 per ct.
Keys, watch, of gold or silver	per cent. 20	30	24	per cent. 25
" all other, of iron, brass, copper, gold, or silver	" 30	30	24	" 35
Kirschenwasser	gal. 60 cts	100	30	gal. 75 c. to $1.05.
Knitting-needles	per cent. 20	20	15	per cent. 25
Knives, all, of iron, steel, copper, brass, pewter, lead, or tin	" 30	30	24	" 35
Knobs, brass, gilt, plated, or washed, iron, steel, copper, or brass	" 30	30	24	" 35
Knobs, cut-glass	lb. 45 cts	40	30	" 35
" glass, not cut	lb. 12 cts	30	24	" 30
" " with brass, iron, steel, or composition shanks	" 30	30	24	" 35
Knockers	" 30	30	24	" 35
Kreosote	" 30	30	24	" 40
Labels, decanter or other, gilt or plated	" 30	30	24	" 35
Labels, decanter or other, gold or silver	" 30	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Labels, printed	per cent. 30	30	24	per cent. 20
Lac dye	free,	5	4	free.
“ sulphur	free,	20	4	free.
Lace, all kinds of, made into wearing apparel	per cent. 30	30	24	per cent. 35
Lace, bobbinet	“ 20	25	24	“ 25
“ bobbinet veils, cotton	“ 30	30	24	“ 35
“ coach, worsted	“ 35	25	19	p. ct. 35; silk, 40
“ shawls, if sewed	“ 30	30	24	per cent. 35
“ caps, pelerines, chemisettes, handkerchiefs, collars and capes, vails, cotton	“ 40	30	24	“ 35
Laced boots or bootees	pair 25 to $1.25	30	24	“ 35
Laces, all thread	per cent. 15	20	15	“ 30
“ gold and silver	“ 15	30	24	“ 35
Lacets, or lacings, silk	“ 30	25	19	p. ct. 40; cotton, 35
Lacquered ware	“ 30	30	24	per cent. 40
Ladles, iron, tin, Britannia, brass, copper, or gilt	“ 30	30	24	“ 35
Lake, (water colors)	“ 20	30	24	“ 35
“ drop, do	“ 20	30	24	“ 35
“ paints	“ 20	30	24	“ 25
Lampblack	“ 20	20	15	“ 20
Lamp hooks or pulleys, brass, copper, iron, or wood	“ 30	30	24	“ 35
Lamps, brass, copper, tin, or plain glass	“ 30	30	24	“ 35
Lamps, cut-glass	lb. 45 cts	40	30	“ 35
“ with glass chimneys	per cent. 30	30	24	“ 35
Lancet cases	“ 35	30	24	“ 35
Lancets	“ 30	30	24	“ 35
Lanterns, japanned, tin, gilt, plated, brass, pewter, or copper	“ 30	30	24	“ 35
Lasting, in strips, for buttons, shoes, or bootees	“ 5	5	4	“ 10
Latches, iron, brass, steel, gilt, plated, washed, or copper	“ 30	30	24	“ 35
Lath	“ 20	20	15	“ 20
Laudanum	“ 20	30	24	“ 40
Lavender, dry, flower of	“ 20	20	15	“ 20
“ flower	“ 20	20	15	“ 20
“ water	“ 25	30	24	“ 50
Lead, all manufactures of, not otherwise specified	“ 30	30	24	“ 35
“ black	“ 20	20	15	ton $10.
“ busts	“ 30	30	24	per cent. 35
“ combs	lb. 4 cts	30	24	“ 35

	1842.	1846. per ct.	1857. per ct.	1862.
Lead, in bars	lb. 3 cts	20	15	lb. 1½ cts.
" in pigs	lb. 3 cts	20	15	lb. 1½ cts.
" in sheets	lb. 4 cts	20	15	lb. 2¼ cts.
" nitrate of	per cent. 20	20	15	lb. 3 cts.
" old	lb. 1½ cts	20	15	lb. 1 ct.
" ore	lb. 4 cts	20	15	lb. 1 ct.
" pencils	per cent. 25	30	24	gross $1.
" pipes	lb. 4 cts	20	15	lb. 2¼ cts.
" pots, black	per cent. 20	30	24	per cent. 35
" powder of black	" 20	20	15	ton $10.
" scrap	lb. 1½ cts	20	15	lb. 1 ct.
" shot	lb. 4 cts	20	15	lb. 2¼ cts.
" sugar of	lb. 4 cts	20	15	lb. 4 cts.
" toys	lb. 4 cts	30	24	per cent. 35
" white	lb. 4 cts	20	15	100 lbs. $2.40.
Leather & all manufactures where leather is chief value	per cent. 35	30	24	per cent. 35
" bracelets, elastic	" 35	30	24	" 35
" garters, elastic	" 35	30	24	" 35
" calf, tanned	lb. 8 cts	20	15	" 30
" patent	lb. 8 cts	20	19	" 35
" sole	lb. 6 cts	20	15	" 35
" upper	lb. 8 cts	20	15	" 25
Leaves for dyeing, in a crude state,	free,	20	free,	free.
" boucho	per cent. 20	20	4	lb. 10 cts.
" medicinal, in a crude state,	" 20	20	15	per cent. 20
" other, not otherwise provided for	" 20	20	15	"
Leeches	free,	20	free,	free.
Lees, wine, liquid	free,	20	15	per cent. 20
Leghorn, and all hats or bonnets of straw, chip, or grass	per cent. 35	30	24	" 40
Leghorn flats, braids, crowns, or plaits	" 35	30	24	" 30
Lemons, in bulk or in boxes, barrels, or casks	" 20	20	8	" 20
" juice	" 20	10	8	" 10
" peel	" 20	20	15	" 10
Lime	" 20	10	8	" 10
" acetate of	" 20	10	8	" 20
Limes	" 20	20	8	" 20
" juice	" 20	10	8	" 10
Linen bags	" 25	20	15	" 35
" canvas, black	" 25	20	15	" 35
" mitts	" 25	20	24	" 35
" tape	" 25	20	15	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Linens, bleached or unbleached...	per cent. 25	20	15	p. ct. 30 for 30 cts. or under per sq. yd.
" all manufactures of, not otherwise specified......	" 25	20	15	
Lines, fishing	lb. 6 cts	30	24	per cent. 35
" worsted	per cent. 30	25	19	" 35
Linseed	" 5	10	free,	bush. 16 cts.
Linseed cakes or meal	" 20	20	15	per cent. 20
Linsey-woolsey	" 40	30	24	lb. 18 cts. & p. ct. 30
Lint	" 20	20	15	" 35
Liquor, iron	" 20	20	15	" 10
" purple	" 20	20	15	" 20
" red	" 25	20	15	" 20
" tin	" 20	20	15	" 20
" cases	" 30	30	24	" 35
Liquorice paste or juice	" 25	20	15	lb. 5 cts.
" root	" 20	20	15	lb. 1 ct.
Litharge	lb. 4 cts	20	15	lb. 2¼ cts.
Lithographic stones	per cent. 20	20	15	per cent. 20
Loadstones	" 30	20	15	" 20
Lotions, all cosmetic	" 25	30	24	" 50
Lozenges, all medicinal	" 20	30	24	" 50
Locks, all	" 30	30	24	" 35
Looking-glasses, plates or frames,	" 30	30	24	" 35
Lunar caustic	" 20	30	24	" 40
Lye, soda	" 20	20	15	" 20
Maccaroni	" 30	30	24	" 35
Mace	lb. 50 cts	40	4	lb. 30 cts.
Machinery, models of, and other inventions	free,	free,	free,	free.
Machinery for the manufacture of flax and linen goods	per cent. 30	30	8	free.
Madder	free,	5	free,	free.
Madder root	free,	5	free,	free.
Magic lanterns	per cent. 30	30	24	per cent. 35
Magnesia	" 20	30	24	lb. 12 cts.
" carbonate of	" 20	30	24	lb. 6 cts.
" sulphate of	" 20	20	15	lb. 1 ct.
Mahogany, unmanufactured	" 15	20	8	free.
Mallets, wood	" 30	30	24	per cent. 35
Malt	" 20	20	15	" 20
Manganese	" 20	20	15	" 10
Mangoes	" 20	20	15	" 10
Mangroves, or shells of	" 20	20	15	" 20
Manilla grass	ton $25	25	19	ton $25
Manna	per cent. 20	20	15	lb. 25 cts.
Mantillas, silk	" 30	30	24	per cent. 40

	1842.	1846. per ct.	1857. per ct.	1862.
Mantles	per cent. 30	30	24	per cent. 40
Manufactured tobacco	lb. 10 cts	40	30	lb. 35 cts.
Maps	per cent. 20	10	free,	per cent. 20
Marble busts, as statuary	" 30	30	free,	" 10
" manufactures of	" 30	30	24	per cent. 50
" table-tops	" 30	30	24	" 50
" unmanufactured	" 25	20	15	cubic ft. 40 cts.
Marbles, toy, baked or stone	" 30	30	24	per cent. 35
Marrow	" 10	10	8	" 10
Mastic, crude	" 15	20	8	lb. 50 cts.
" refined	" 20	20	8	lb. 50 cts.
Mathematical instruments for colleges and schools	free,	free,	free,	free.
Mathematical instruments	per cent. 30	30	24	per cent. 35
Matches for pocket lights	" 20.	20&30.	15&24	" 35
Mats, cocoa-nut	" 25	25	15	" 30
" oil or floor-cloth, dish or table	" 30	30	24	" 35
" sheepskin	" 30	30	24	" 35
" table, tow, straw, or flag	" 25	25	19	" 35
Matting, cocoa-nut	" 25	25	15	" 30
" all floor of flags, or grass,	" 25	25	19	" 30
Mattresses, hair or moss, linen tick	" 20	20	15	" 25
Meats, prepared	" 25	40	30	" 35
Medals and other antiquities	free,	free,	free,	free.
Medicinal preparations, not otherwise specified	per cent. 20	30	24	" 40
Medicinal drugs, roots, and leaves, in a crude state, not otherwise specified	" 20	20	15	" 20
Metal, plated	" 30	30	24	" 35
Metallic pens	" 25	30	24	" 35
" slates, paper or tin	" 25	25	19	" 35
Metals, unmanufactured, not otherwise provided for	" 30	20	15	" 20
Mercury or quicksilver	" 5	20	15	" 10
" all preparations of	" 25	25	19	" 20
Merino cloth, entirely of combed wool	" 40	25	19	" 35
" cloth, wool	" 40	30	24	lb. 18 cts. & 30 or 35 per cent.
" fringe, worsted	" 30	25	19	" 35
" shawls, of wool	" 40	30	24	lb. 18 cts. & 30 or 35 per cent.
" " body worsted or combed wool	" 40	25	19	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Merino shawls, border woolen fringe, sewed on	per cent. 40	30	24	per cent. 35
“ trimmings, worsted	“ 30	25	19	“ 35
Manilla hemp	ton $25	25	19	ton, $25.
Mica	per cent. 20	20	15	per cent. 30
Millinery of all kinds	“ 40	30	24	“ 35
Mill saws	each $1	30	24	ft. 12½ to 20 cts.
Mills, coffee	per cent. 30	30	24	“ 35
Miniature cases, ivory	“ 30	30	24	“ 35
Miniatures	free,	free,	free,	“ 10
Mineral and bituminous substances in a crude state, not otherwise provided for	per cent. 30	20	15	per cent. 20
Mock pearls	“ 20	10	8	“ 35
Modelling, specially imported	free,	free,	free,	free.
Modelling, not specially imported,	per cent. 30	30	24	per cent. 35
Models of invention, not for use	free,	free,	free,	free.
Molasses	lb. 4½ mills	30	24	gal. 6 cts.
“ concentrated	lb. 4½ cts	30	24	lb. 2 cts.
Mops	per cent. 30	30	24	per cent. 35
Morocco skins	doz. $1.50	20	15	“ 25
Morphine, acetate, sulphate, or crystals of	per cent. 25	30	24	oz. $2.
Mortars, brass or composition	“ 30	30	24	p.ct. 35; marble, 50
Moss, Iceland	“ 20	20	15	per cent. 10
“ for beds	“ 10	20	15	“ 20
Mosaics, real, not set	“ 7	10	4	“ 5
“ “ set	“ 20	30	24	“ 25
Moulds, button	“ 25	25	19	“ 30
Mouse traps, wood or wire	“ 30	30	24	“ 35
Muffs, of fur	“ 35	30	24	“ 35
Muriate of barytes, or strontian	“ 20	20	15	“ 20
“ gold	“ 20	20	15	“ 20
Music, in sheets or bound	“ 25	10	4	20
Musical instruments	“ 30	20	15	“ 30
“ instrument strings of gut,	“ 15	20	15	“ 30
“ “ , “ part of metal	“ 15	30	24	“ 35
Mushrooms, prepared	“ 30	40	30	“ 35
Musk	“ 20	30	24	“ 50
Musket barrels	“ 30	30	24	“ 35
“ bayonets	“ 30	30	24	“ 35
“ bullets	lb. 4 cts	20	15	“ 35
“ rods or stocks	per cent. 30	30	24	“ 35
Muskets	stand $1.50	30	24	“ 35
Myrrh, gum, crude	per cent. 15	20	15	“ 20
“ refined	“ 20	20	15	“ 20

	1842.	1846. per ct.	1857. per ct.	1862.
Nails, cut	lb. 3 cts	30	24	lb. 1¼ cts.
" wrought-iron	lb. 4 cts	30	24	lb. 2¼ cts.
Nankeen shoes or slippers	pair 25 cts	30	24	per cent. 35
Needles, all kinds	per cent. 20	20	15	" 25
" crotchet	" 30	30	24	" 35
Nests, birds'	" 20	20	15	" 20
Nets, fishing	lb. 7 cts	30	24	" 35
Nickel	free,	5	4	" 10
Nippers	per cent. 30	30	24	" 35
Nitrate of barytes	" 20	20	15	" 20
" iron	" 20	20	15	" 20
" lead	" 20	20	15	lb. 3 cts.
" silver or lunar caustic	" 20	30	24	per cent. 20
" strontium	" 20	20	15	" 20
" tin	" 20	20	15	" 20
Noyeau	gal. 60	100	30	gal. 75
Nut-galls	free,	5	4	free.
Nutmegs	lb. 30 cts	40	4	lb. 30 cts.
Nuts for dyeing, crude	free,	5	free,	free.
" all not specially mentioned,	lb. 1 ct	30	24	lb. 2 cts.
Nux vomica	free,	10	8	free.
Oakum and junk	free,	free,	free,	free.
Oatmeal	per cent. 20	20	15	per cent. 10
Oats	bush. 10 cts	20	15	bush. 10 cts.
Ochre, dry	lb. 1 ct	30	15	100 lbs. 50 cts.
" in oil	lb. 1½ cts	30	15	" $1.50.
Ochres, all, or ochery earths, when dry	lb. 1 ct	30	15	" 50 cts.
Ochres, all, or ochery earths, in oil,	lb. 1½ cts	30	15	" $1.50.
Odors or perfumes	per cent. 25	30	24	per cent. 50
Oil cakes	" 20	20	15	" 20
" cloth	yd. 35 cts	30	24	" 35
" fish, and all productions of American fisheries	free,	free,	free,	free.
" Harlæm	per cent. 20	30	24	per cent. 50
" hemp-seed	gal. 25 cts	20	15	gal. 23 cts.
" kerosene and other coal	per cent. 20	20	15	" 20 cts.
" linseed	gal. 25 cts	20	15	" 23 cts.
" olive, in casks	" 20 cts	30	24	" 25 cts.
" rape-seed	" 25 cts	20	15	" 23 cts.
" spermaceti, of foreign fishing.	" 25 cts	20	15	per cent. 20
Oil of cocoa-nuts	per cent. 20	10	4	" 10
" neats' foot	" 20	20	15	" 20
" palm	free,	10	4	" 10
" palm bean	free,	10	4	" 10
Olives	per cent. 30	30	24	" 30

	1842.	1846. per ct.	1857. per ct.	1862.
Onions	per cent. 20	20	15	per cent. 10
Opium	lb. 75 cts	20	15	lb. $2.
" extract of	per cent. 25	30	24	per cent. 40
Orange bitters	" 20	30	24	" 50
" crystals	" 20	20	15	" 20
" flowers	" 20	20	15	" 10
" flower water	" 20	30	24	" 50
" issue peas	" 20	30	24	" 40
" peel	" 20	20	15	" 10
Oranges	" 20	20	8	" 20
Ore, specimens of	free,	20	15	" 10
Organs	per cent. 30	20	15	" 30
Ornaments, gilt wood, gold paper, or for ladies' head-dresses, silk,	" 30	30	24	" 35
Ornaments, not for head-dresses, of metal	" 30	30	24	" 35
Orpiment	" 15	10	8	" 20
Orris-root	" 20	20	15	" 20
Osiers for baskets	" 20	20	15	" 30
Ostrich plumes and feathers	" 25	30	24	" 40
Oxymuriate of lime	" 20	20	15	" 20
" or chlorate of potasse,	" 20	20	15	lb. 6 cts.
Oysters	" 20	20	15	free.
Pack-thread	lb. 6 cts	30	24	per cent. 35
Paddy	per cent. 20	20	15	lb. ¾ ct.
Paintings on glass	" 30	30	24	per cent. 10
" porcelain	" 30	30	24	" 10
Paints, carmine	" 20	30	24	" 35
" dry or ground in oil, not otherwise provided for,	per cent. 20	20	15	" 25
" Spanish brown, dry	lb. 1 ct	20	15	100 lb. 50 cts.
" " " in oil	lb. 1½ cts	20	15	" $1.50.
" terra umbra	per cent. 20	20	15	lb. 50 cts.
" water colors	" 20	30	24	per cent. 35
" white lead	lb. 4 cts	20	15	lb. 2¼ cts.
Painters' colors	per cent. 20	20	15	per cent. 25
Palm-leaf hats or baskets	p.c. 25 & 35	30	24	40 and 35 per ct.
" leaves, unmanufactured	free,	10	free,	free.
Pannel saws	per cent. 30	30	24	per cent. 35
Paper, for screens or fireboards	" 35	20	15	" 35
" hangings	" 35	20	15	" 35
" all other, and all manufactures of	various,	30	24	" 35
Parasols, silk	per cent. 30	30	24	" 35
Parasol sticks or frames	" 30	30	24	" 35
Parchment	" 25	30	24	" 30

	1842.	1846. per ct.	1857. per ct.	1862.
Paris white, dry	lb. 1 ct.	20	15	100 lbs. 60 cts.
“ “ ground	lb. 1½ cts.	20	15	“ $1.50.
Parts of stills of copper	per cent. 30	30	24	per cent. 35
Paste almond	“ 25	30	24	“ 50
“ imitation of precious stones,	“ 7	10	8	“ 35
“ perfumed	“ 25	30	24	“ 50
“ work that is set	“ 25	30	24	“ 30
Pastel or woad	lb. 1 ct.	10	4	free.
Paving-stones	per cent. 25	20	15	per cent. 10
Pearl, mother of	free,	5	4	free.
Pearls, all	“ 7	10	4	per cent. 5
“ composition	“ 25	30	24	“ 30
“ mock	“ 7	10	8	“ 35
“ set	“ 25	30	24	“ 25
Peanuts	lb. 1 ct.	20	15	“ 10
Peas	per cent. 20	20	15	“ 10
Pelts, salted	“ 5	5	4	“ 10
Pencils, black lead, camels' hair, or red chalk	“ 25	30	24	gross $1 & p.ct.35
“ slate	“ 20	20	15	per cent. 40
Pencil cases, gold, silver, gilt, or plated	“ 25	30	24	“ 35
Penknives	“ 30	30	24	“ 35
Pens, metallic	“ 25	30	24	gross 10 cts.
“ quill	“ 25	30	24	per cent. 30
Pepper, black or white	lb. 5 cts.	30	4	lb. 12 & 15 cts.
“ Cayenne, Chili, or African,	lb. 10 cts.	30	4	lb. 12 & 15 cts.
Percussion caps	per cent. 30	30	15	per cent. 30
Perfumed soap for shaving	“ 30	30	24	per ct. 30 & lb. 2 c.
Perfumery vials and bottles	various,	30	24	per cent. 30
Perfumes	per cent. 25	30	24	“ 50
Personal and household effects, not merchandize, of citizens of the U. S., dying abroad	free,	free,	free,	free.
Peruvian bark	free,	15	free,	per cent. 20
Petticoats, ready-made, cotton	per cent. 50	30	24	“ 35
Pewter, manufactures of, not enumerated	“ 30	30	24	“ 35
Pewter, old, fit only to be re-manufactured	free,	5	4	lb. 1 ct.
Phosphate of lime	per cent. 20	20	15	per cent. 20
“ of soda	“ 20	20	15	“ 20
Phosphorus	“ 20	20	15	“ 20
Phosphorus lights, in glass bottles, with paper cases	“ 20	30	24	“ 35
Phosphuret of lime	“ 20	20	15	“ 20
Piano-fortes	“ 30	20	15	“ 30

	1842.	1846. per ct.	1857. per ct.	1862.
Piano-forte ferrules	per cent. 30	30	24	per cent. 35
Pickles	“ 30	30	24	“ 35
Pimento	lb. 5 cts	40	4	lb. 12 cts.
Pincers	per cent. 30	30	24	per cent. 35
Pincushions, cotton	“ 30	25	24	“ 35
“ silk	“ 30	25	19	“ 40
Pine-apples	free,	20	8	free.
Pin or needle-cases, all	per cent. 30	30	24	per cent. 35
Pins	lb. 20 cts	30	24	“ 35
Pins, silver, iron, or pound	lb. 20 cts	30	24	“ 35
Pipes, clay and wood	per cent. 30	30	24	“ 35
Pistols	“ 30	30	24	“ 35
Pitch	“ 25	20	15	“ 20
“ Burgundy	“ 20	25	19	“ 20
Plaster busts, casts, statues	free,	30	free,	“ 10
“ court, on silk or on cambric	per cent. 30	30	24	“ 35
“ of Paris, unground	free,	free,	free,	free.
“ “ ground	“ 20	20	15	per cent. 20
“ “ calcined	“ 20	20	15	“ 20
“ ornaments	“ 30	30	24	“ 35
Plane irons	“ 30	30	24	“ 35
Planes	“ 30	30	24	“ 35
Planks, wrought or rough	“ 20	20	15	“ 20
Plants	free,	free,	free,	“ 30
Plated wares of all kinds	per cent. 30	30	24	“ 35
Plate, silver	“ 30	30	24	“ 35
Platina, unmanufactured	free,	free,	free,	free.
“ manufactures of	per cent. 20	30	24	per cent. 35
“ retorts	“ 20	30	24	free.
Playing-cards	pack 25 cts	30	24	pack 15 & 25 cts.
Ploughs	per cent. 30	30	24	per cent. 35
“ plane	lb. 1 ct	30	24	“ 35
Plumbago	per cent. 20	20	15	ton $10.
Plumes, ornamental	“ 25	30	24	“ 40
Plums	“ 25	30	8	lb. 5 cts.
Plush, hair	“ 20	25	19	per cent. 30
“ mohair or goats’ hair	“ 20	25	19	“ 35
“ or shag, worsted	“ 30	25	19	“ 35
“ wool	“ 40	30	24	lb. 18 cts. & p. ct. 25
Pocket-books, leather	“ 35	30	24	per cent. 35
“ paper	“ 30	30	24	“ 35
Pocket-bottles, green glass	gross $3	30	24	“ 30
Polishing-stones	free,	10	8	free.
Pomatum	per cent. 30	30	24	per cent. 50
Pomegranates	“ 20	20	8	“ 10
Poppy heads	“ 20	20	15	“ 20
“ oil	“ 20	20	15	“ 50

	1842.	1846. per ct.	1857. per ct.	1862.
Poppy seed	" 20	free,	free,	" 20
Porcelain	" 30	30	24	p. ct. 35 & 40
" glass	" 30	30,	24	per cent. 35
" slates	" 25	25	19	" 35
Pork	lb. 2 cts	20	15	lb. 1 ct.
Porphyry	per cent. 20	30	24	per cent. 35
Portable desks	" 30	30	24	" 35
Porter, in bottles	gal. 20 cts	30	24	gal. 30 cts.
" otherwise	" 15 cts	30	24	" 20 cts.
Potasse, prussiate of	per cent. 20	20	15	lb. 5 cts.
Potassium	" 20	20	15	lb. 15 ct.
Potatoes	bush. 10 cts	30	24	bush. 25 cts.
Pots, black lead	per cent. 30	30	24	per cent. 35
" blue	" 30	30	24	" 35
" cast-iron	lb. 1½ cts	30	24	lb. 1½ cts.
" melting, earthen	per cent. 30	30	24	per cent. 20
Poultry, or game, prepared	" 25	40	30	" 35
Pounce	" 20	20	15	" 20
Powder, black lead	" 25	20	15	ton $10.
" blue	" 25	20	15	per cent. 20
" of brass	" 25	20	15	" 20
" puffs	" 20	30	24	" 35
" subtil, for the skin	" 25	30	24	" 50
Powders and pastes	" 25	30	24	" 50
Precious stones, glass, imitation of, set	" 25	30	24	" 30
" " of all kinds, not set	" 7	10	4	" 5
" " other imitations of,	" 7	10	8	"
set	" 25	30	24	" 35
Prepared clay	" 30	20	15	" 20
" vegetables, meats, poultry and game	" 25	40	30	" 35
Preserves in molasses and all others	" 25	40	30	" 35
Pressing-boards	lb. 12½ cts	30	24	" 35
Prints or engravings	" 20	10	8	" 20
Prisms, cut-glass	lb. 45 cts	30	30	" 35
Professional books of persons arriving in the U. S	free,	free,	free,	free.
Protractors, ivory-mounted	per cent. 30	30	24	per cent. 35
Prunella	" 30	25	19	" 35
" for shoes, bootees, and buttons	" 5	5	4	" 10
Prunes	lb. 3 cts	40	8	lb. 5 cts.
Prussian blue	per cent. 20	20	4	per cent. 25
Pullies, iron, brass, copper or wood	" 30	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Pumice	free,	10	8	free.
Pumpkins	free,	20	15	per cent. 10
Purple, brown	per cent. 25	20	15	" 25
" tin liquor	" 25	20	15	" 20
Putty	lb. 1½ cts	20	15	lb. 1½ cts.
Quadrants and sextants	per cent. 30,	30	24	per cent. 35
Quill baskets	" 25	30	24	" 30
Quills	" 15	20	15	" 30
Quiltings, or bed-quilts, cotton	" 30	25	24	" 35
Quicksilver	" 5	20	15	" 10
Quinine	" 20	20	15	" 45
" sulphate of	oz. 40 cts	20	15	" 45
Rags, of any kind, except wool	lb. ½ ct	5	free,	free.
Raisins, boxes or jars	lb. 3 cts	40	8	lb. 5 cts.
" other	lb. 2 cts	40	8	lb. 5 cts.
Rakes, iron, steel, or wood	per cent. 30	30	24	per cent. 35
Rape of grapes	" 20	20	15	" 20
" seed	" 20	10	8	lb. 1 ct.
Rasps	" 30	30	24	35 p.ct. & lb. 2 cts.
Rattans, unmanufactured	free,	10	free,	free.
" manufactured	per cent. 20	20	24	per cent. 25
Rattles, wood, ivory, coral, or with bells	" 30	30	24	" 35
Ravens duck, hemp or flax	sq. yd. 7 cts	20	15	" 30
Razors	per cent. 30	30	24	" 35
Razor cases	" 30	30	24	" 35
" strops, wood	" 30	30	24	" 35
Reaping-hooks, iron or steel	" 30	30	24	" 35
Red chromate of potash	" 25	20	15	lb. 3 cts.
" lead, ground in oil	lb. 4 cts	20	15	100 lbs. $2.40.
" precipitate	per cent. 25	20	15	per cent. 20
" Venetian, dry	lb. 1 ct	30	15	" 25
" " ground in oil	lb. 1½ cts	30	15	" 25
" wood and red sanders' wood	free,	5	free,	free.
" wool, or fur for hatters	free,	10	8	per cent. 10
Reeds, unmanufactured	free,	10	free,	free.
" manufactured	per cent. 20	30	24	per cent. 25
" weavers'	" 30	30	24	" 35
Reindeer skins, dressed	various,	20	15	" 20
" " undressed	"	5	4	" 10
" " tanned	"	20	15	" 25
" tongues	per cent. 25	20	15	" 20
Reps, natural silk and cotton	" 30	25	19	" 35
" silk	lb. $2.50	25	19	(See Silk.)
Resin	per cent. 15	20	8	per cent. 20

	1842.	1846. per ct.	1857. per ct.	1862.
Resin, of jalap	per cent. 15	20	8	per cent. 20
" nux vomica	" 15	20	8	" 40
Rhodium	" 15	20	8	" 40
Rhubarb	free,	20	15	lb. 50 cts.
Rice	per cent. 20	20	15	lb. 1½ cts.
Rifles	each $2.50	30	24	per cent. 35
Rings, all metal	per cent. 30	30	24	" 35
Rivets, brass, iron, and steel	" 30	30	24	" 35
Rochelle salts	" 20	20	15	lb. 15 cts.
Rods and eyes, for stairs	" 30	30	24	per cent. 35
Roman cement	" 20	20	15	" 20
" vitriol	lb. 4 cts	20	15	" 20
Rope, made of hides cut in strips,	per cent. 20	20	15	" 20
" or cordage of cocoanut shells	lb. 4½ cts	25	19	lb. 3½ cts.
Roots, all not otherwise enumerated	free,	free,	free,	per cent. 30
" arrow	per cent. 20	20	15	" 20
" madder	free,	5	free,	free.
" medicinal, other, crude	per cent. 20	20	15	per cent. 20
Rose leaves	" 25	20	15	lb. 50 cts.
" water	" 25	30	24	per cent. 50
Rosin	" 15	20	8	" 20
Rotten stone	free,	10	8	free.
Rouge	per cent. 20	30	24	per cent. 50
Rubies	" 7	10	4	" 5
" set	" 25	30	24	" 25
Rugs, for bed-coverings, cotton	" 30	25	24	" 35
" all other	" 40	30	24	" 35
Rules, all	" 30	30	24	" 35
Rum	gal. 60@90c.	100	30	(See Gin.)
" bay, or bay water	per cent. 20	30	24	gal. 50 cts.
" cherry	gal. 60	100	30	gal. 75 cts.
Rye	bush. 15 cts	20	15	bush. 15 cts.
" flour	per cent. 20	20	15	per cent. 10
Sabres	" 30	30	24	" 35
Saddle hooks	" 30	30	24	" 35
Saddle trees	" 30	30	24	" 35
Saddlery, all not otherwise specified	" 30	30	24	" 35
" silver-plated, brass, or steel	" 30	30	24	" 35
" tinned, japanned, or common	" 20	20	15	" 35
Saddles	" 30	30	24	" 35
Saffron	free,	20	15	" 10
" cake	per cent. 20	20	15	" 10

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Sago	per cent. 20	20	15	lb. 1½ cts.
Sail duck	sq. yd. 7 cts	20	15	per cent. 30
Sal ammoniac	per cent. 20	10	8	“ 20
“ diuretic	“ 20	20	15	“ 20
Salmon, preserved	bbl. $2	30	24	“ 35
“ pickled	per cent. 20	20	30	bbl. $3.
Salt, bulk	bush. 8 cts	20	15	100 lbs. 18 cts.
“ otherwise	“ 8 cts	20	15	“ 24 cts.
Salted skivers, roans or pelts	per cent. 5	5	4	per cent. 10
Saltpetre, partially refined	lb. ¼ ct	10	8	lb. 3 cts.
“ refined	lb. 2 cts	10	8	lb. 3 cts.
“ crude	free,	5	4	lb. 2 cts.
Salts, chemical, all	per cent. 20	20	15	per cent. 20
Sardines, in salt	“ 20	20	15	bbl. $1.50.
“ and all fish in oil	“ 20	40	30	per cent. 30
Sarsaparilla	free,	20	15	“ 20
Sashes, silk	lb. $2.50	30	24	“ 35
Sassafras	per cent. 20	20	15	“ 20
Saucepans, metal	“ 30	30	24	“ 35
Sauces, all kinds	“ 30	30	24	“ 35
Sausages	“ 25	30	30	“ 35
Saws, cross-cut	each $1	30	24	lin. ft. 8 cts.
“ mill-pit and drag	each $1	30	24	“ 12½ to 20 c.
Saw sets	per cent. 30	30	24	per cent. 35
Scagliola tables or slabs	“ 30	40	30	“ 35
Scales	“ 30	30	24	“ 35
Scarfs, cotton	“ 30	30	24	“ 35
“ wool	“ 40	30	24	lb. 18 cts. & p. c. 35
Scissors	“ 30	30	24	per cent. 35
Scoop-nets	lb. 7 cts	30	24	“ 35
Scrapers	per cent. 30	30	24	“ 35
Sea-weed, and all other vegetable substances used for beds or mattresses	“ 20	20	15	“ 20
Seeds, garden	free,	free,	free,	“ 30
“ all others not specified	free,	free,	free,	various.
Segars, worth $5 per M.	lb. 40 cts	40	30	lb. 35 cts.
“ “ $5–$10 per M	lb. 40 cts	40	30	lb. 60 cts.
“ “ $10–$20 “	lb. 40 cts	40	30	p. c. 10 & M. 80 cts.
“ “ $20 “	lb. 40 cts	40	30	p. c. 10 & M. $1.
“ paper	lb. 15 cts	40	30	as other segars.
Seltzer water	per cent. 20	30	24	per cent. 30
Senna	“ 20	20	15	“ 20
Sextants	“ 30	30	24	“ 35
Shades, lace, sewed	lb. $2.50	30	24	“ 35
Shaving-soap	per cent. 30	30	24	p. c. 30 & lb. 2 cts.
Shawls, wool	“ 40	30	24	p.ct. 35 & lb. 18 c.

	1842.	1846. per ct.	1857. per ct.	1862.
Shawls, other	p.ct. 20 & 30	30	24	per cent. 35
Shears	per cent. 30	30	24	" 35
Sheathing-metal, patent, composed in part of copper	free,	free,	free,	lb. 3 cts.
Sheathing-paper	lb. 15 cts	20	15	per cent. 10
Sheets, willow	per cent. 30	30	24	" 30
Sheetings, linen, hemp, or Russia, brown or white	" 25	20	15	" 30
Shellac	free,	5	4	lb. 10 cts.
Shell, baskets	per cent. 25	30	24	per cent. 35
" boxes, not otherwise enumerated	" 20	30	24	" 35
" turtle or tortoise	" 5	5	4	free.
Shells, all other	" 20	5	4	free.
Shingles	" 20	30	24	per cent. 35
Shoe-binding, silk	" 30	25	19	" 40
" " woolen	" 30	30	24	p.ct. 30 & lb. 18 c.
" thread	" 30	20	15	per cent. 35
Shoes or slippers for children	pair 15 cts	30	24	" 35
" " for grown persons, of silk	" 30 cts	30	24	" 35
" " of leather, for men	" 30 cts	30	24	" 35
" " of prunella, stuff, or other materials, except silk, for women	" 25 cts	30	24	" 35
Shoes, *i. e.* double-soled pumps and welts, women's leather	" 25 cts	30	24	" 35
Shot bags and belts	per cent. 35	30	24	" 35
Shovels	" 30	30	24	" 35
Shrubs	free,	free,	free,	" 30
Shuttlecocks and battledores	per cent. 30	30	24	" 35
Sickles, iron, steel	" 30	30	24	" 35
Side-arms	" 30	30	24	" 35
Silk and cotton-vesting	" 30	25	19	" 35
" and worsted valencias, toilenets or crape de Lyons	lb. $2.50	25	19	" 35
" and worsted shawls, hemmed,	per cent. 30	30	24	" 35
" " manufactures of	" 30	25	19	" 40
" aprons, collars, cuffs, chemisettes, turbans, mantillas, and pellerines	lb. $2.50	30	24	" 35
" bobbin or braids	per cent. 30	25	19	" 40
" caps, if entirely of silk	lb. $2.50	30	24	" 35
" cords	lb. $2.50	25	19	" 40
" curls	lb. $2.50	30	24	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Silk floss and other similar, purified from the gum	per cent. 25	30	19	per cent. 30
“ frizettes	“ 30	30	24	“ 35
“ garters, with wire and clasps,	“ 30	30	24	“ 35
“ gloves	lb. $2.50	30	24	“ 35
“ hat-bands	lb. $2.50	25	19	“ 40
“ hats or bonnets for women	each $1	30	24	“ 40
“ hose	per cent. 40	30	24	“ 35
“ “ sewed	“ 40	30	24	“ 35
“ lace	lb. $2.50	25	19	“ 40
“ manufactures with gold or silver, or other metal	per cent. 30	30	24	“ 35
“ mitts	lb. $2.50	30	24	“ 35
“ “ sewed	lb. $2.50	30	24	“ 35
“ not more advanced in manufacture than singles, or tram	lb. 50 cts	15	12	“ 25
“ ornaments, oil cloth, suspenders, stocks	per cent. 30	30	24	p. c. 35 ; oil cl. 40
“ sewing, all	lb. $2	30	24	per cent. 40
“ “ raw	lb. 50 cts	15	free,	“ 40
“ tassels	lb. $2.50	25	19	“ 40
“ watch-chains or ribbons	lb. $2.50	25	19	“ 35
“ webbing	per cent. 30	25	19	“ 45
“ all other articles	“ 30	30	24	“ 35
Silks, at $1 per yard or less	lb. $2.50	25	19	“ 40
“ over $1 per yard	lb. $2.50	25	19	“ 40
Silver, all manufactures of, not otherwise specified	per cent. 30	30	24	“ 35
“ bullion and coin	free,	free,	free,	free.
“ German, in sheets	per cent. 30	30	24	per cent. 35
“ “ manufactures of,	“ 80	30	24	“ 35
“ plated metal, in sheets or other form	“ 30	30	24	“ 35
Syrup of sugar-cane	lb. 2½ cts	30	24	lb. 2 cts.
Skates, under 20 cts	per cent. 30	30	24	pair 8 cts.
“ over “	“ 30	30	24	per cent. 35
Skeletons	“ 30	20	15	“ 20
Skins, calf and seal, tanned and dressed	doz. $5	20	15	“ 30
“ for saddlers, etc	lb. 8 cts	20	15	“ 20
“ glazed, as patent-leather	per cent. 35	20	19	“ 35
“ goat and sheep, tanned and not dressed	doz. $1	20	15	“ 25
“ goat or morocco, tanned and dressed	doz. $2.50	20	15	“ 25

	1842.	1846. per ct.	1857. per ct.	1862.
Skins, kid and lamb, tanned and not dressed	doz. 75 cts	20	15	per cent. 25
" kid, tanned and dressed	" $1	20	15	" 25
" of all kinds in the hair, dried, raw, or unmanufactured	per cent. 5	5	4	" 25
" pickled, in casks	" 20	5	4	" 10
" sheep, tanned or dressed	doz. $2	20	15	" 25
" with wool	" $1	20	15	" 15
" tanned and dressed, otherwise than in colors, viz.: fawn, kid, and lamb, known as chamois	" $1	20	15	" 25
Skivers, pickled	per cent. 20	5	4	" 10
" tanned	doz. $2	20	15	" 25
Slates of all kinds	per cent. 25	25	19	" 40
Sledges	lb. 2½ cts	30	4	lb. 2½ cts.
Smalts	per cent. 20	20	15	per cent. 20
Snails	" 20	20	15	" 10
Snuff	lb. 12 cts	40	30	lb. 35 cts.
Snuffers	per cent. 30	30	21	per cent. 35
Soap, all	lb. 4 cts	30	24	lb. 2 cts. & 30 & 35 per cent.
Soda, ash	per cent. 5	10	4	lb. ½ ct.
" preparations or manufactures of	" 20	20	15	
Soles, felt or cork	" 30	30	24	per cent. 35
Spars	" 30	20	15	" 20
Spa, or Spaware	" 30	40	30	" 35
Specimens, anatomical preparations	" 30	30	24	" 35
Spectacle cases, all	" 30	30	24	" 35
" glasses, not set	gross $2	30	24	" 35
" " pebble, not set.	" $2	30	24	" 35
Spectacles, all	per cent. 30	30	24	" 35
Spelter, in pigs, bars, or plates	free,	5	4	lb. 1¼ cts.
" in sheets	" 20	15	12	lb. 2 cts.
" manufactures of	" 20	30	24	per cent. 35
Spokes	" 30	30	24	" 35
Spokeshaves	" 30	30	24	" 35
Sponges	" 20	20	8	" 20
Spoons, all	" 30	30	24	" 35
Spurs	" 30	30	15&24	" 35
Spy-glasses	" 30	30	24	" 35
Starch	lb. 2 cts	20	15	p. c. 20 & lb. ½ ct.
Statues and specimens of statuary	free,	free,	free,	per cent. 10
Staves, all	per cent. 20	20	15	" 25

	1842.	1846. per ct.	1857. per ct.	1862.
Steel in ingots, bars, sheets, or wire over ¼ in. diam., valued 7 cts. or less	cwt. $2.50	15&20	15	lb. 1¾ cts.
Do. do. valued 7@11 cts.	" $2.50	20	15	lb. 2½ cts.
Steel, any form not provided for	" $2.50	20	15	per cent. 25
" wire, No. 16@¼ in. in diam.	lb. 5 cts	20	15	lb. 2 cts. & p.ct. 20
" " less than No. 16	lb. 8 cts	20	15	lb. 2½ cts. & p.ct. 20
" all manufactures of	per cent. 30	30	24	per cent. 35
Stereotype plates	" 25	20	15	" 25
Still-worms	" 30	30	24	" 35
" bottoms	" 30	30	24	" 25
Stomach pumps	" 30	30	24	" 35
Stone, Armenian	" 20	20	15	" 10
" ware, common	" 30	30	24	" 20
Stones, Bristol	" 20	10	15	" 10
" mill, fit for use	" 20	10	15	" 20
" not merchantable, ballast	" 20	20	15	" 10
" oil	" 20	20	15	" 20
Straw baskets	" 25	30	24	" 35
" carpets and carpeting	" 25	25	24	" 35
" for hats, in natural state	" 30	20	15	" 10
Stretchers for umbrellas and parasols	" 12½	30	24	" 35
Strings, bow, if gut	" 15	20	15	" 30
" hatters', if gut	" 15	20	15	" 30
" of musical instruments, if gut	" 15	20	15	" 30
Strychnine	" 20	30	24	" 30
Succory, ground	" 20	20	15	lb. 3 cts.
Sugar, raw	lb. 2½ cts	30	24	lb. 2½ to 3½ cts.
" refined, loaf, lump, crushed, pulverized	lb. 6 cts	30	24	lb. 4 cts.
" refined, tinctured or colored	lb. 6 cts	30	24	lb. 10 cts.
" syrup, concentrated molasses and melado	lb. 2½ cts	30	24	lb. 2 cts.
" white or clayed	lb. 4 cts	30	24	lb. 4 cts.
" moulds, hooped or not	per cent. 30	30	24	per cent. 35
Sulphuric ether	" 20	20	15	" 20
Sumac	free,	5	4	" 10
Surgeons' instruments, all	per cent. 30	30	24	" 35
Suspenders, all	" 35	30	24	" 35
Swans, down of	" 25	25	19	" 30
Sweatmeats or comfits, all	" 25	40	30	" 35
Sword-knots, gold and silver, fine and half-fine	" 30	30	24	" 35
" lace	" 30	30	24	" 35
" silk or worsted	" 30	25	19	" 35

	1842.	1846. per ct.	1857. per ct.	1862.
Table-tops, scagliola	per cent. 30	40	30	per cent. 35
Tallow	lb. 1 ct	10	8	lb. 1 ct.
" candles	lb. 4 cts	20	15	lb. 2½ cts.
Tamarinds	per cent. 20	20	8	per cent. 10
" preserved	" 25	40	30	" 35
Tamboreens	" 25	20	15	" 20
Tannin, medicinal	" 30	30	24	" 35
Tapers, paper, with cotton wick	" 30	30	24	" 35
" stearine	" 30	20	15	lb. 5 cts.
" spermaceti or wax	" 30	20	15	lb. 8 cts.
Tapioca	" 25	20	15	per cent. 20
Tar, Barbadoes, crude	" 15	20	15	" 20
" coal	" 15	20	15	" 20
Tarpaulings	" 20	20	15	" 20
Tartrate of antimony, or tart. emetic	" 20	20	15	b. 15 cts.
Teas, all kinds, from beyond Cape of Good Hope	free,	free,	free,	per cent. 20
Teas, other	per cent. 20	20	15	" 20
Telescopes	" 30	30	24	" 35
Thibet, cashmere of	" 30	25	19	" 35
" shawls, real or goats' hair,	" 40	30	24	" 35
" " of wool	" 40	30	24	lb. 18 c. & p. ct. 35
" " body cotton	" 30	30	24	per cent. 35
Thimbles, all	" 30	30	24	" 35
Thread, escutcheons	" 30	30	24	" 35
" pack	lb. 6 cts	30	24	" 35
Tiles, marble	per cent. 30	30	24	" 35
" paving and roofing	" 25	20	15	" 20
" encaustic	" 25	20	15	" 35
Timber, hewn or sawed	" 20	20	15	" 20
Time-pieces	" 25	30	24	" 35
Tin, all manufactures of	" 30	30	24	" 35
" banca	lb. 1 ct	5	free,	" 15
" block	lb. 1 ct	5	free,	" 15
" boxes	per cent. 30	30	24	" 30
" crystals of	" 30	20	15	" 30
" foil	lb. 2½ cts	15	12	" 30
" granulated	lb. 2½ cts	20	15	" 20
" in bars	lb. 1 ct	5	free,	" 15
" in pigs	lb. 1 ct	5	free,	" 15
" in plates	lb. 2½ cts	15	8	" 25
" " galvanized	lb. 2½ cts	15	8	lb. 2½ cts.
" in sheets	lb. 2½ cts	15	8	per cent. 25
" liquor	per cent. 20	20	15	" 20
" muriate of	" 20	20	15	" 30
" oxide of	" 20	20	15	" 30

	1842.	1846. per ct.	1857. per ct.	1862.
Tinctures, bark, and other medicinal	per cent. 30	30	24	per cent. 40
" odoriferous	" 25	30	24	" 50
Tippets, if classed as millinery	" 30	30	24	" 35
Tobacco, manufactured	lb. 10 cts	40	30	lb. 35 cts.
" leaves, or unmanufactured	per cent. 20	30	24	per cent. 25
Toilet glasses	" 30	30	24	" 35
Tongues, neats, smoked	" 20	20	15	" 20
" reindeer	" 20	20	15	" 20
" sounds	" 20	20	15	" 20
Tonqua beans	" 20	20	15	" 20
Tools and implements of trade in use by persons arriving in the United States	free,	free,	free,	free.
Tooth brushes or powders	per cent. 30	30	24	35 and 50 per ct.
" picks, all	" 30	30	24	p.ct. 35; quills,30
Toys, of every description	" 30	30	24	per cent. 35
Trays and waiters, all	" 30	30	24	p.c. 35; japan'd 40
Treacle, molasses	lb. 4½ mills	30	24	gal. 6 cts.
Trees	free,	free,	free,	per cent. 30
Trusses	per cent. 30	30	24	" 35
Tubes, cast	" 30	30	24	" 35
" wrought	" 30	30	24	" 35
Turpentine, spirits of	gal. 10 cts	20	15	gal. 15 cts.
Turtle, green	per cent. 20	20	15	per cent. 20
Twine	lb. 6 cts	30	24	" 35
Types, metal	per cent. 25	20	15	" 25
" new	" 25	20	15	" 25
" old	" 25	20	15	free.
Umber		20	15	lb. ½ ct.
Umbrellas	per cent. 30	30	24	per cent. 35
Umbrella furniture	" 30	30	24	" 35
Vanilla, beans	" 20	20	15	lb. $3.
" plants of	free,	free,	free,	per cent. 30
Varnishes, of all kinds	per cent. 20	20	15	p. c. 20 & gal. 50 c.
Vases, porcelain	" 30	30	24	per cent. 40
Vegetables, prepared	" 20	40	30	" 35
" used in dyeing, crude,	free,	5	free,	free.
" not otherwise provided for	" 20	20	15	" 10
Veils, lace, cotton, or silk	" 50	30	24	" 35
Vellum	" 25	30	24	" 35
Velvet binding, cotton	" 30	25	24	" 35
" " silk	lb. $2.50	25	19	" 40

	1842.	1846. per ct.	1857. per ct.	1862.
Velvet cotton	per cent. 30	20	24	per cent. 30
" silk	doz. $2.50	25	19	" 35
Verdigris	per cent. 20	20	15	lb. 6 cts.
Vermicelli	" 30	30	24	per cent. 35
Vermillion	" 20	20	15	" 25
Vessels, cast-iron, not otherwise specified	lb. 1½ cts	30	24	lb. 1¼ cts.
" copper	per cent. 30	30	24	per cent. 35
Vestings, cotton	" 30	25	24	
Vests	" 50	30	24	" 30
Vinegar	gal. 8 cts	30	24	gal. 6 cts.
Violins	per cent. 30	20	15	per cent. 30
Violin strings, gut	" 15	20	15	30 and 35 p. ct.
Vitriol, blue	lb. 4 cts	20	15	" 20
" green	lb. 2 cts	20	15	lb. ½ ct.
" oil of	lb. 1 ct	10	4	lb. 1 ct.
" white	per cent. 20	20	15	per cent. 20
Wadding paper	" 30	30	24	" 35
Wafers	" 25	30	24	" 35
Wagon boxes	lb. 1½ cts	30	24	" 30
Waiters, all	per cent. 30	30	24	" 35
Walking-sticks or canes	" 30	30	24	" 35
Washes	" 25	30	24	" 50
Waste or shoddy	" 10	5	4	" 20
Watch crystals, when not set	gross $2	30	24	" 35
Watches	per cent. 7½	10	8	" 20
Watch materials and parts of watches	" 7½	10	4	" 20
Water wheels, of iron	lb. 1½ cts	30	24	" 30
" colors	per cent. 20	30	24	" 35
Wax beads	" 25	30	24	" 30
" bees', bleached or unbleach'd	" 15	20	15	" 10
" sealing	" 25	30	24	" 35
" shoemakers'	" 15	20	15	" 20
Webbing, India-rubber	" 30	30	24	" 35
Wedgewood ware	" 30	30	24	" 35
Weld	free,	5	4	free.
Wet blue	per cent. 20	20	15	per cent. 25
Whalebone, of foreign fishing	" 12½	20	15	" 20
" of American fishing	free,	free,	free,	free.
Wheat	bush. 25 cts	20	15	bush. 20 cts.
" flour	112 lbs. 70 c	20	15	per cent. 20
Whetstones	per cent. 20	20	15	" 20
Whips	" 35	30	24	" 35
Whisky, all	gal. 60 cts	100	30	(see Gin.)
Whiting	lb. 1 ct	20	15	dry, lb. ½c.; oil, 1½

	1842.	1846. per ct.	1857. per ct.	1862.
Wick cotton or wick yarns, as cotton yarn	per cent. 30	25	24	per cent. 35
Wigs	“ 25	30	24	“ 35
Willows	“ 25	20	15	“ 20
Wines, all	gal. 6@60 c.	40	30	“ 50
Wire, brass	per cent. 25	30	24	“ 35
“ all other	lb. 5@11 cts	30	24	“ 35
Wood, bar	free,	5	free,	free.
“ Brazil	free,	5	free,	free.
“ Brazilletto	free,	5	free,	free.
“ camwood	free,	5	free,	free.
“ chessmen	per cent. 30	30	24	per cent. 35
“ dye, all in sticks	free,	5	free,	free.
“ ebony and granadilla	per cent. 20	20	8	free.
“ fire	“ 20	30	24	per cent. 20
“ lignum vitæ	“ 30	30	8	free.
“ log	free,	5	free,	free.
“ Nicaragua	free,	5	free,	free.
“ Pernambuco	free,	5	free	free.
“ red	free,	5	free,	free.
“ rose, satin, cedar, mahogany, and all cabinet	per cent. 15	20	8	free.
“ sandals, in sticks, dust, or powder	free,	5	free,	free.
“ unmanufactured, of any kind not enumerated	per cent. 20	30	24	per cent. 20
“ all manufactures of, not otherwise specified	“ 30	30	24	“ 35
Wool, all manufactures of	“ 40	30	24	p.ct. 30 & lb. 18 c.
“ and hair of alpaca, goat, other like animals unmanufactured—value, less than 18 cts	7c. or less per cent. 5	30	free,	per cent. 5
Do. do. at 18 cts	lb. 3c. & p.c. 30	30	free,	“ 5
Do. do. 18@24 cts	“ “	30	24	lb. 3 cts.
Do. do. over 24 cts	“ “	30	24	lb. 9 cts.
Wool, belts for paper	per cent. 25	30	24	per cent. 30
“ blankets for printers	“ 25	30	24	“ 30
“ clothing, ready made, all kinds	“ 50	30	24	lb. 18 c. & p. ct. 30
“ cloths, shawls, and all manufactures	“ 40	30	24	lb. 18 c. & p. c. 30
“ delaines, cashmeres, barege, gray	“ 40	30	24	s. yd. 2c. & p. c. 30
“ hats	each 18 cts	20	15	per cent. 30
“ on the skin	lb. 3c. & p.c. 30	20	15	“ 15
Woolen bags	per cent. 40	30	24	lb. 18 c. & p. c. 30
“ cassimere	“ 40	30	24	lb. 18 c. & p. c. 30

	1842.	1846. per ct.	1857 per ct.	1862.
Woolen stockings, bindings, mitts, gloves, floor-cloth or hosiery	per cent. 30	30	24	per cent. 35
Woolen and worsted yarn,				
Finer than No. 14	" 30	30	19	lb. 12 c. & p. c. 30
Value 50 cts. or less, and not finer than No. 14	" 30	30	19	per cent. 30
Value 50 cts. and not over $1,	" 30	30	19	lb. 12 c. & p. c. 20
" over $1	" 30	30	19	lb. 12 c. & p. c. 30
Worms for stills	" 30	30	24	per cent. 35
Wormwood, oil of	" 30	30	24	" 50
Worsted stuff, all piece goods	" 30	25	19	" 35
" and silk shawls	" 30	30	24	" 35
" " " hemmed,	" 30	30	24	" 35
" " manufactures of	" 30	25	19	" 35
" all manufactures of	" 30	25	19	
Yams		20	15	" 10
Yarns, coir		20	15	lb. 1½ cts.
" hemp		20	15	lb. 5 cts.
Zinc, nails	per cent. 30	30	24	per cent. 35
" in pigs, or unwrought	free,	5	4	lb. 1¼ cts.
" in sheets	" 10	15	12	lb. 2 cts.
" oxide of	" 20	20	15	lb. 1¾ cts.
" manufactures of	" 30	30	24	per cent. 35

Within the decade of which we are writing 5,941 inventions were patented in the United States, and among them two of the most important of the present century, viz., the SEWING MACHINE and the MAGNETIC TELEGRAPH.

It is the misfortune of the gentleman who probably invented the first valuable Sewing Machine, that he neglected to patent it, and was unwilling to undertake the immense labor necessary to introduce into practical use a machine so novel in its character. There is on record considerable testimony to the effect, that as early as 1836, Walter Hunt, of New York, a very ingenious and prolific inventor, designed a Sewing Machine that would make the interlocked stitch, and that, though he neglected to patent it, he sold the privilege of manufacturing such machines to a Mr. Arrowsmith, who however took no thorough or practical means to test the value of the invention.

The first American patent for a Sewing Machine of which we have any record, was one granted to John J. Greenough, of Washington City, February 21, 1842. This machine made what is called the through-and-through or shoemaker's stitch. The needle was pointed at both ends, with the eye in the centre, and was drawn through the cloth one way and then the other by a pair of pincers. We are not aware that any machines, except the model, were ever constructed. In the succeeding year, March 4, 1843, Benjamin W. Bean, of New York, patented a machine for making the running or basting stitch. The cloth was corrugated and a long needle thrust through the fold, and then, the stitch being straightened, was held together somewhat as it is in basting by hand. In the same year George R. Corlies, of Greenwich, N. Y., patented a machine similar to Greenough's; but the first complete Sewing Machine designed and adapted to general purposes, was that patented September 10, 1846, by Elias Howe, Jr., of Cambridge, Massachusetts. One of the principal features of this machine is the combination of a grooved needle, having an eye near its point, and vibrating in the direction of its length, with a side pointed shuttle for effecting a locked stitch, and forming with the threads, one on each side of the cloth, a firm and lasting seam. The main action of the machine consists in the interlocking of the loop, made by the thread carried in the point of the needle through the cloth, with another thread passed through the loop by means of a shuttle entering and leaving it at every stitch. The thread attachment to this shuttle remains in the loop, and secures the stitch as the needle is withdrawn, to be ready to make the next one, and at the same time the cloth is carried forward just the length of the stitch by what is called the feed motion. Wonderfully successful as this machine has been, no prophetic eye then foresaw its glorious future, and no capitalist was willing at that time to risk money in an enterprise so Utopian as manufacturing Sewing Machines appeared to be. Disappointed in finding encouragement at home, the patentee sought it in England, but he was met by a skepticism even more obdurate and discouraging than that of his countrymen, and he returned home in a sailing vessel, paying for his passage by manual labor, and arrived literally penniless.

Since the date of Mr. Howe's patent about 300 improvements upon the Sewing Machine have been patented, some of them, to which we shall elsewhere advert, of hardly less importance than the original invention. Large manufactories have been erected that are now furnishing machines at the rate of more than a hundred a day, and are yet unable to supply the demand. In 1860 the census returns show an aggregate of 116,330 machines made in that year in nine States, of which the value was $5,605,345. In the manufacture of clothing, caps, shirts, boots and shoes, this little machine has effected almost a revolution, and the amount saved by its use in these branches alone is estimated to exceed sixteen millions of dollars annually. The business however is yet in its infancy, and the past results, wonderful as they are, furnish scarcely a criterion by which we can judge of its future.

The other grand invention which we have mentioned as having its origin between 1840 and 1850, perhaps properly belongs to the preceding decade. We believe that it is established that Samuel Finley Breeze Morse conceived and originated a practical plan of Telegraphic communication as early as the autumn of 1832, but it was not until 1844 that the first line of Telegraph in the United States was completed. This was the line between Baltimore and Washington, for which Congress in March, 1843, had appropriated $30,000, to enable Professor Morse to test his system of Electro Magnetic Telegraphs. The history of this application is another record of persevering effort amidst many discouragements. As early as the autumn of 1838 Mr. Morse was in Washington exhibiting his invention to Congressional committees; but, though the results were manifest, the idea seemed too impracticable to justify the appropriation of money, and the session closed without a report in its favor. The inventor then visited England and France to endeavor to secure the patronage of European governments, but in England he was refused letters-patent, and in France he received only a useless *brevet d' invention*, and no exclusive privilege in any other country.* He returned home to struggle again for several years with scanty means, and though his efforts were unremitted during the session of 1842–3, he retired on the last night of the session without a hope of success; and we may imagine how greatly he was astonished to hear on the morning of March 4, 1843, that at the midnight hour Congress had appropriated the sum above mentioned to test the practical value of his invention by establishing a line between Baltimore and Washington. The results are before the world. In the sixteen years intervening between 1844 and 1860, it is estimated that 50,000 miles of telegraphic wires were put in operation in the United States alone, and since that time the number has been largely increased by the completion of the line from Saint Louis to San Francisco, which was opened Oct. 25, 1861, and thence to Oregon. In Great Britain and Ireland there are about 40,000 miles in operation; in Germany 35,000 miles; in France 26,000; in Russia 12,900; in Italy 6,600; and in Switzerland 2,000 miles.

The following is a List of the most Important Inventions Patented between 1840 and 1850.

1840

In 1840 there were 473 Patents issued from the Patent Office, including the following: One to Isaac Newton Stanley, of Philadelphia, for an improved mode of constructing Cars for Railroads and guiding them thereon; to William Field, Pawtucket, R. I., for an improvement in Swages or Dies for making Screw Augurs; to Erastus B. Bigelow, Massachusetts, for a Counterpane Weaving Power Loom; to William Russell, New York City, a new and improved manner of preparing and laying Wooden Blocks, either on horse-tracks for railroads or on common roads and streets; to John S. Gilbert, New York City, for an improved mode of constructing Dry Docks; to Samuel F. B. Morse, New York City, for an Electric Telegraph; to John Ames, Springfield, Massachusetts, for a machine for Making, Ruling, and Cutting Paper; to Eleazer Carver, Bridgewater, Mass., for a machine for Filing the Teeth of Saws; to Henry M. Nayler, Philadelphia, for an improvement in Railway Tracks for turning Short Curves; to Michael B. Dyott, Philadelphia, for an improvement in the Lamp for Burning Camphene; to Charles F. Pike, Providence, R. I., for an improved mode of constructing the Packing for Pistons of Steam Engines; to Ruggles, Nourse & Mason, assignees of Elbridge G. Mathews, Worcester, Mass., for a machine for Hewing Plough Beams, etc.; to Julius Pratt, George Read and others, assignees of William M. Fowler, North Brantford, Conn., for a machine for planing and forming Ivory Comb Plates; to Stephen P. Ruggles, Boston, Mass., for improvements in the Printing Press; to Norman T. Winans and Thaddeus Hyatt, New York City, for a machine for making Splints for Friction Matches; to William A. Lighthall, Albany, New York, for an improvement in Cut-Off Valves of Steam Engines; to Matthias W. Baldwin, Philadelphia, for an improvement in the manner of connecting the Piston Rod with the Pistons of Steam Cylinders and in Constructing Locomotives; to Jordan L. Mott, New York, for improvements in the Cooking Stove; to Ross Winans, Baltimore, for an improvement in the mode of Regulating the Waste Steam in Locomotives.

In the succeeding year four hundred and ninety-five patents were issued, including the following: To Edwin M. Chaffee, Cambridgeport, Mass., for manufacturing Balls of India Rubber; to Timothy Gilbert, Boston, Mass., for improvements in Pianofortes; to Moses and Samuel Pennock, Chester County, Pennsylvania, for improvements in the Drill

1841

or Seed Planter; to Robert Cornelius, Philadelphia, for an improvement in Gas Lamps; to John J. Howe, Derby, Connecticut, for improvements in the machine for making Pins; to Benjamin and Henry B. Tatham, Philadelphia, for improved Leaden Pipe; to Benjamin F. Greenough, Boston, Mass., for improvements in Lamps for burning Chemical Mixtures; to Prouty & Mears, Boston, Mass., for improvements in the Plough; to Thomas J. Wells, New York City, for a machine for cutting Dovetails and Tenons; to Henry N. Wells, New York City, for Shrinking and Napping Hat Bodies and Cloth; to Samuel Slocum, Poughkeepsie, N. Y., for a machine for Sticking Pins in Papers; to Daniel Harrington, Philadelphia, for a mode of rendering the Pockets of Garments safe from Pickpockets; to Abel Symonds and A. G. Page, Fitchburg, Mass., for a machine for Turning or Bending the Heel of Scythes; to Newton & Archbold for a method of producing ornamental or tambour work in Stitching the Backs of Gloves; to Charles Davenport and Albert Bridges, Cambridgeport, Mass., for an improved method of constructing Railway Carriages so as to ease the lateral motion.

1842

In 1842 the number of Patents issued was 517, which included one to Richard M. Hoe, of New York City, for improvements in Cylinder and Double-Cylinder Printing Presses; to Horatio Allen, New York City, for improvements in the Cut-off Valves of Steam Engines; to Stephen Tomlinson, Bridgeport, Conn., for an improvement in the Spring Perch for Carriages; to Frederick E. Sickels, New York, for a Cut-off Valve; to William Baker, Utica, N. Y., for a machine for manufacturing from wood a Substitute for Curled Hair in stuffing cushions; to Ellis S. Archer, Philadelphia, for an improvement in the Lard Lamp; to Cullen Whipple, Providence, R. I., for a machine for cutting the Threads of Wood Screws; Jonathan Read, Alton, Illinois, for an improvement in Reaping Machines; J. J. Greenough, Boston, for a Sewing Machine; W. F. Steiger, Washington, D. C., for Spiral Fluted Nails and Bolts.

1843

In 1843 the number of Patents issued was 531, the most important being—one to Benjamin Brandreth, New York City, for an improvement in making Vegetable Extracts; one to William Norris, Philadelphia, assignee, for an improvement in constructing the Carriages of Locomotive Steam Engines; to John J. Howe Derby, Connecticut, for an improvement in the machine for sticking Pins in Rows in sheets of paper; to Moses Pond, Boston, Mass., for an improvement in Cooking Ranges; to Thomas Blanchard, Boston, Mass., for an improvement in machinery for turning or cutting Irregular Forms; to Napoleon E. Guerin, New York City, for an improvement in Hatching Chickens by artificial heat; to Robert Cornelius, Philadelphia, for improvement in Lard Lamps; to Charles Wilhelm, Philadelphia, for a similar improvement; to Thaddeus Fairbanks, St. Johnsbury, Vermont, for an improvement in the method of Removing Dust, Metallic Particles, etc., in Grinding; to Robert Newell, New York, for an improvement in Locks; to John F. Winslow and Thomas Osgood, Troy, N. Y., for an improvement in the machine for forming Horse Shoes, Chain Links, etc.; to Jonas Chickering, Boston, Mass., for an improvement in Piano Fortes; to Cornelius Briggs, Roxbury, Mass., for an improvement in Extension Tables; to Henry Burden, Troy, N. Y., for an improvement in the machine for manufacturing Horse Shoes; to Nathaniel J. Wyeth, Cambridge, Mass., for an Ice Cutting machine, etc.; to David Bruce, Jr., Williamsburg, N. Y., for an improvement in casting Printing Types; to John M. and Lyman Hollingsworth, Boston, Mass., for making Paper from Manilla Grass; to A. Peteler, New Brighton, New York, for an Ice-Cream Freezer—the principle being to freeze and beat at the same time.[1]

1844

In 1844 the number of Patents issued was 502. Among the most important were the following: To Richard F. Loper, Philadelphia, for an improvement in the rotary inclined Propeller for vessels; to Charles Goodyear, New York, for corrugated or shurred India Rubber Goods, and improvements in the manner of preparing India Rubber Fabrics; to Obed M. Coleman, Philadelphia, for an Æolean Attachment for Piano Fortes; to Richard M. Hoe, New York, for improvements in Printing Presses; to Linus Yale, Springfield, Mass., for an improvement in Door Locks; to Robert Newell, New York, for improvements in the Permutation Lock; to Seth Adams, Boston, Mass., for an improvement in the Hand Printing Press; to Horace H. Day, Jersey City, N. J., for an improvement in the machine for Stitching the Threads or Strips of India Rubber and covering the same with cloth in the manufacture of Shurred Goods; to William P. Ketchum, Buffalo, New York, for a Mowing or Reaping Machine.

In 1845 the number of Patents issued was precisely the same as the preceding year, of which the more important were the following: To Ethan Allen, Norwich, Conn., for improvement in the Locks of Pistols and other Firearms; to James Semple, Alton, Illinois, for a Steam Car to run on Prairies; to David Bruce, Jr., New York, for a machine for Casting Printing Types; to Charles Goodyear, New Haven, Conn., for a Water-Proof manufacture composed of two elastic substances; to

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(1) This invention received an honorable mention at the Exhibition of Industry of all nations, held in New York. Mr. Peteler has also invented an apparatus for Cooling Rooms, Hospitals, etc., and Disinfecting Vessels by Frost.

1845

Cullen Whipple, Providence, R. I., for a machine called the Self-Adjusting Screw Finisher; to Wm. W. Woodworth, administrator of Wm. Woodworth, deceased, the patent reissued for a Planing Machine; to James Bogardus, New York City, for a machine for Cutting India Rubber; to Frederick E. Sickels, New York City, for an improved method of operating the Drop Cut-off Valves of steam engines and casting the steam-chests with the cylinder; to Samuel H. Gilman, Boston, for machinery for manufacturing Forks; to Charles Thurber, Norwich, Conn., for a machine for Writing called the Chirographer; to E. B. Bigelow, Massachusetts, for a Loom for weaving Carpets; Calvin B. Rogers, Saybrook, Conn., for an improvement in machinery for Dressing Combs.[1]

1846

In 1846 six hundred and nineteen Patents were issued, the most important being—one to Samuel F. B. Morse, New York City, for a Magnetic Telegraph; to William Kumbel, New York, for improvements in Leather Belts for driving machinery and in the Machinery for making them; to Royal E. House, New York City, for improvements in the Magnetic Letter Printing Telegraph; to Henry A. Wells, New York City, for improvements in Machinery for the manufacture of Hat Bodies; to Josiah Warren, Harmony, Indiana, for a Composition of matter to be used as a Substitute for Type Metal, and on which impression can be made with types; to John Perrins, Philadelphia, for improvements in the Jacquard Frame for weaving Figured Fabrics; to M. W. Baldwin, for improvements in Locomotive Engines and the Steam Whistle; to Thomas W. Harvey, New York, for improvements in the machine for cutting the threads of Wood Screws; to M. Vassar, Poughkeepsie, N. Y., for a Vent-Plug or Cork for bottles, etc., containing fermented fluids; to Ross Winans, Baltimore, for improvements in Locomotive Steam Engines; to John A. Roebling, Trenton, N. J., for improvements in the Wire Cable or Chain Suspension Bridge; to William Mason, Taunton, Mass., for a new Self-Acting Mule for Spinning Cotton and other fibrous substances; to Moses Pond, Boston, Mass., for an improved Cooking Range; to Benj. F. Palmer, Meredith, N. H., for improvements in Artificial Legs and Feet;[2] to C.

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(1) Mr. Rogers appears to have been the first person who ever invented self-acting machinery for Comb Dressing. Previous to this invention the blanks or bits of ivory of which the Comb is made were fashioned by hand, and a good workman could dress 600 blanks per day. By means of Rogers' machine 3000 blanks can be finished per day. About 400,000 dozen Finetooth Ivory Combs are now made annually in this country.

(2) This is the first mention of an invention that has since become very celebrated, and may at this time be said to be really of national importance. It had its origin in the experiments which the inventor made to provide himself with a substitute for a leg which had been amputated in consequence of an accident. He was then a young man,

T. Jackson and W. T. G. Morton, Boston, Mass., for a combination of Ether, etc., for performing Surgical Operations without pain; to Chas. Baeder, Philadelphia, for a process of finishing Raw-Hide Whips by pressing and planing them; to Jeremiah Carhart, Buffalo, N. Y., for improvement in the Bellows of Seraphines; to Hezekiah Augur, New Haven, Conn., for an improvement in Carving Machines; to Elias Howe, Jr., Cambridgeport, Mass., for a Sewing Machine; to Solyman Merrick, Springfield, Mass., for an improvement in Feeders for Screw Machines.

1847

In 1847 the number of Patents issued was 572, which included a patent to Alva B. Taylor and A. B. Burr, New York City, for an improvement in making or setting-up Hat Bodies; to Albert G. Bagley, New York, for an improvement in Metallic Pens; to Alfred Stillman, New York, for an improvement in preventing Explosions of Steam Boilers; to Frederick Leypoldt, Philadelphia, for an improvement in the Scarificator; to Asa Whitney, Philadelphia, for improvements in Car Wheels; Isaac Judson, New Haven, Conn., for improved machinery for Dressing Staves; to Joseph Powell, Nelson

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we believe a student of law, but the value of his invention was so manifest, and the demand for it so pressing, that he was induced to devote himself to the manufacture of his patent limbs. He established manufactories in Springfield, Mass., Boston, New York, and Philadelphia. In 1851 he visited England to exhibit his invention at the great Exhibition in London, where it received the Prize Medal, and attracted the attention of eminent surgeons and others throughout Europe. Recently he has fixed up an establishment in Philadelphia which probably has not its equal in the world in facilities for manufacturing Artificial Limbs on an extensive scale.

The peculiarities of Mr. Palmer's invention consist—First, in an ingenious arrangement of springs and cords in the inside of the limb, by which, when the wearer is in the erect position, the limb is extended, and the foot flexed so as to present a natural appearance. Second—By a second arrangement of cords and springs in the inside of the limb, the foot and toes are gradually and easily extended when the heel is placed in contact with the ground. In consequence of this arrangement, the limping gait, and the unpleasant noise made by the sudden stroke of the ball of the foot upon the ground in walking, which are so obvious in the ordinary leg, are avoided. Third—By a peculiar arrangement of the knee-joint, it is rendered little liable to wear, and all lateral or rotary motion is avoided. The wood used in the manufacture of these Limbs is willow, which is light, strong, and does not warp, nor does it irritate the parts with which it comes in contact. The shaping is all done by hand, very much as a sculptor finishes his marble, and with an eye to artistic effect. The hollowing out of the interior is done by scoops at the end of long stems resembling dentists' instruments. The joints are most carefully made, more particularly at the knee, where a strong belt of steel passes through the solid wood. Windows, or oblong openings, are left in the sides of the limb to insure a good supply of air to the mutilated part.

Since the issue of the first patent mentioned in the text Mr. Palmer has secured several others, one especially for an Arm and Hand, patented in 1857. A Board of Army Officers appointed to select an Arm for the Army and Navy, have reported in favor of this patent, and the inventor has been commissioned by the Surgeon-General to supply them.

Barlow, and Edward Holden, St. Louis, Missouri, assignors to Robert G. Eunson, New York City, for an improvement in machines for Planing, Tonguing and Grooving; to George W. Campbell, New York, for an improvement in the manufacture of Bullets; to Mark Fisher and William Marten, Jr., Newport, Maine, for an improvement in Welding Cast Iron to Malleable Iron or Steel.

In 1848 the number of Patents issued increased to 660, the most important being one to Martin Kalbfleisch, Bushwick, N. Y., for an **1848** improvement in the manufacture of Prussiates of Potash and Soda; to W.V. Maury, Albany, New York, for an improvement in Car Wheels; to H. P. Russ, New York, for an improvement in Substrata for Pavements; to Asa Whitney, Philadelphia, for an improvement in Annealing and Cooling Cast Iron Car Wheels; to Charles F. Durant, Jersey City, for an improvement in Dissolving and Softening Gutta Percha and Caoutchouc; to Horace H. Day for an improvement in preparing Gutta Percha Fabrics in imitation of Leather; to J. H. Schomacker, Philadelphia, for an improvement in Pianofortes; to Rob't L. & Francis B. Stevens, New York, for an improvement in Propelling Vessels; to J. C. Vaughn and J. F. Winslow, Troy, N. Y., for an improvement in machinery for Welding Iron Pipes; to Jordan L. Mott, New York, for an improvement in Cooking Stoves; to Collins & Co., assignees of Elisha K. Root, Collinsville, Conn., for an improvement in machinery for Dressing Axes; William Easby, Washington, D. C., for a method of converting Fine Coal into Solid Lumps; to Christian Sharps, Cincinnati, Ohio, for an improvement in the Sliding Breech Pin and Self-Capping Gun known as Sharps' Rifle; to Henry P. Westcott, Seneca Falls, New York, for a machine that will point as well as punch Wooden Pegs; to Gilbert Gorrie and William Lucas, Troy, N. Y., for a machine for making Sand Paper; to H. B. Masser, Sunbury, Penn., for an improved Ice Cream Freezer known as Masser's Five-Minute Freezer.

In 1849 the number of Patents issued was 1076, which included Geo. H. Corliss' celebrated improvement in Working the Valves of Steam **1849** Engines, Lewis Fagin's improvement in Mills for Grinding, Richard Garsed's improvement in Looms for weaving Figured Fabrics, Thomas Blanchard's improvement in Bending Wood, John A. Whipple's improvement in taking Daguerreotype Pictures, Samuel L. Crocker's method of making yellow Cut Nails, and lastly, a Patent to His Excellency, Abraham Lincoln, of Springfield, Illinois, for an Apparatus for Buoying Vessels, which we trust is sufficiently powerful to buoy up and keep afloat the Ship-of-State.

CHAPTER VII.

THE MANUFACTURES OF THE UNITED STATES.

1850–1863.

An English writer has observed that the history of British Manufactures furnishes abundant ground for astonishment; but that of American Manufactures is much more marvellous.

In 1850, the Federal Government for the first time attempted to ascertain, with an approach to accuracy, the exact development of the Productive industry of the country, not counting any establishment that did not produce five hundred dollars per year; and the astounding fact was revealed that the capital invested in Manufactures exceeded five hundred and fifty millions of dollars, and that the annual product had reached *ten hundred and nineteen millions of dollars.* Eighty-six per cent. of this vast amount was made in fifteen States, leaving to the other twenty-one States and Territories only fourteen per cent. of the total production. New York held the first position as a seat of manufactures, having made twenty-three per cent. of the whole; Massachusetts and Pennsylvania were next in rank, having made fifteen per cent.; Connecticut, five per cent.; New Jersey, four per cent.; Maryland and Virginia, three per cent.; Rhode Island, New Hampshire, Missouri, Maine, and Kentucky, over two per cent. each. Only one manufacturing interest at that time produced over one hundred millions of dollars annually, viz., flour and meal. Three—viz., boots and shoes, cotton, and lumber—amounted to over fifty millions of dollars; while clothing, machinery, leather, and woolens, filled the complement of the third class, producing between twenty-five and fifty millions of dollars. The manufactures were distributed generally among the various States,—none we believe confined exclusively to any one,—though Massachusetts made eighty-five per cent. of the bonnets and straw goods, forty-six per cent. of the boots and shoes, and one-third of the cottons; Connecticut made one-third of the hardware, including guns, and forty per cent. of the India-rubber goods; Pennsylvania produced eighty per cent. of the coal, one-half the hosiery, one-third of the iron, and two-thirds of the perfumery; Delaware produced one-fourth of the gunpowder; Rhode Island, forty per cent. of the calicoes; Vermont, the same proportion of the scales; North Carolina, ninety per cent. of the turpentine; Ohio, sixty per cent. of the lard-oil; Missouri, three-fourths of the castor-oil; and Wisconsin, one-half the lead. The following table, published in 1858 by the Superintendent of the Census, though manifestly imperfect and erroneous in some of its details, is the best exhibit that we have of the number of establishments, capital invested, number of hands employed, and value of products,—in fact a—

GENERAL SUMMARY OF MANUFACTURES IN THE UNITED STATES DURING THE YEAR ENDING JUNE 1, 1850.

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Product.
Agricultural implements	1,333	$3,564,202	$2,445,765	7,211	9	$6,842,611
Artificial flowers	23	44,100	52,785	62	372	146,120
Asheries	569	485,700	812,190	1,020	4	1,461,533
Bagging, rope, and cordage	417	3,341,506	5,612,247	5,258	799	8,002,893
Baking	2,027	3,390,824	8,367,370	6,351	376	13,294,229
Baskets	67	38,975	40,410	190	13	147,400
Blacksmiths	10,373	5,884,149	5,111,388	24,983	19	16,048,536
Bleachers and dyers	16	563,600	323,924	519	46	686,630
Blocks and pumps	203	339,690	250,088	774	9	878,021
Bonnets, straw, braid, etc	68	836,350	932,674	303	3,468	1,687,248
Book-binders and blank-books,	235	1,063,700	1,560,330	1,778	1,690	3,226,678
Boots and shoes	11,305	12,924,919	23,848,374	72,305	32,949	53,967,408
Boxes, band and fancy	82	136,240	187,796	303	415	434,104
Boxes, packing	206	355,156	500,470	878	13	1,053,741
Brass-foundries	148	1,585,090	2,112,592	1,606	12	3,626,618
Breweries	431	4,072,380	3,055,266	2,336	11	5,728,368
Bricks	1,603	4,367,912	1,474,023	16,726	619	6,610,731
Bricks, fire	4	14,450	2,165	28	......	12,000
Britannia and plated ware	91	592,150	760,978	1,120	156	1,536,765
Brooms	303	314,985	528,842	1,174	10	940,766
Brushes	146	710,800	638,359	1,500	905	1,673,579
Burr mill-stones	9	34,100	25,825	55	......	55,000
Buttons	59	393,000	324,837	467	621	964,359
Cabinet ware	4,242	7,303,356	6,089,546	20,997	1,013	17,063,064
Calico-printers	42	3,922,800	10,462,044	3,351	729	13,680,665
Card machines	31	213,850	267,220	146	14	393,623
Cards, playing	4	147,000	105,260	66	155	176,800
Carpenters and builders	2,790	3,289,308	7,011,930	15,276	6	16,896,519
Carpets	116	3,352,981	3,075,592	3,881	2,805	5,462,634
Carpet-weaving	16	8,396	22,416	37	......	36,025
Cars, railroad	41	896,015	1,393,676	1,554	......	2,493,558
Chandlers	487	4,145,400	7,006,767	2,060	156	10,199,730
Chemicals	170	2,335,715	3,236,380	1,336	54	4,979,630
Clocks	23	499,800	456,834	777	23	1,181,500
Clothiers and tailors	4,278	12,509,161	25,730,258	35,051	61,500	48,311,709
Coaches and carriages	1,822	4,973,707	3,955,689	13,982	58	11,073,630

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Product.
Cloth-dressers	30	20,275	39,879	36	......	55,100
Coal-mining	510	8,317,501	246,414	15,112	6	7,173,750
Coffee and spices	48	438,662	843,254	305	12	1,240,614
Combs	151	633,637	843,482	1,426	362	1,615,850
Confectioners	383	1,035,551	1,691,824	1,388	345	3,040,671
Coopers	2,902	2,883,040	2,644,582	11,900	16	7,126,317
Copper and brass	175	2,850,961	3,062,661	2,388	2	4,942,901
Cork-cutters	11	41,750	53,653	79	2	126,890
Cottons	1,074	76,032,578	37,778,064	32,295	62,661	65,501,687
Cottons and woolens, mixed	103	1,711,720	2,321,986	2,667	1,901	3,693.731
Cutlery and edge tools	401	2,321,895	1,439,462	4,247	28	3,813,241
Daguerreotypists	74	89,925	99,789	141	17	250,267
Distilleries	968	5,409,334	10,548,201	3,985	23	15,770,240
Distilleries, rectifying	38	357,300	658,452	80	......	791,030
Die-sinkers	2	400	550	3	......	3,000
Dyers	46	331,950	754,379	434	26	1,086,795
Engravers	112	172,065	130,714	433	47	566,005
Earthenware	30	57,325	17,103	139	......	100,556
Envelopes	2	10,500	17,180	6	36	45,000
Fire-engines	16	152,760	116,267	248	......	296,230
Fisheries	1,407	8,962,403	71,517	20,814	424	10,056,163
Flax-dressers and spinners	4	135,700	186,000	160	102	301,808
Flour and grist-mills	11,891	54,415,581	113,036,698	23,260	50	136,056,736
Fringe, gimp, and tassels	38	244,350	233,680	205	681	583,000
Furriers	49	1,116,800	643,170	648	430	1,598,695
Gas	30	6,674,000	503,074	950	2	1,921,746
Gas fixtures	20	104,250	130,969	241	......	293,725
Gas meters	2	70,000	42,760	92	......	114,000
Glass	94	3,402,350	1,556,833	5,571	97	4,641,670
Glass-cutters	8	176,600	71,133	174	......	165,950
Gloves	110	181,200	322,837	329	1,609	708,184
Glue	47	519,950	371,616	378	13	652,405
Gold-beaters	20	62,500	216,380	107	57	336,065
Gold	1,015	1,814,012	57,711	4,804	80	9,551,853
Guns	317	577,509	269,673	1,547	......	1,173,014
Hardware,	340	3,539,025	3,015,688	6,149	881	6,957,770
Hats and caps	1,048	4,427,798	7,100,028	6,974	8,226	14,319,864
Hosiery	85	544,735	415,113	835	1,490	1,028,102
India-rubber goods	84	1,455,700	1,608,728	1,010	1,558	3,024,335
Ink	14	116,650	72,673	49	4	213,643
Ink and lamp-black	3	16,500	29,318	13	......	62,024
Iron forges	375	8,517,011	5,338,506	7,698	77	9,002,705
Iron foundries	1,319	14,722,749	8,534,024	18,938	31	20,111,517
Iron furnaces	404	16,648,360	7,538,118	20,847	207	13,491,898
Iron manufactures	99	603,800	596,364	1,079	3	1,425,343
Iron mining	197	923,775	65,651	2,192	3	1,217,803
Iron rolling	65	5,214,700	4,353,150	3,800	20	6,930,081
Japanners	9	69,200	48,440	108	14	127,250
Lamps	26	486,300	490,862	918	20	1,060,022
Lamp-black	5	41,250	20,925	23	1	42,260
Lead pipe	10	272,250	678,330	71	......	797,166
Lead	156	603,196	1,532,585	737	16	2,150,068
Leather-belting	4	26,000	78,035	15	3	105,500
Legs, artificial	3	2,700	1,400	15	......	14,300
Lithographers	11	76,600	49,650	104	58	136,000
Lime	761	1,124,072	1,106,775	2,834	4	2,286,242
Locomotives	3	445,000	320,440	802	......	680,000
Looking-glass and picture frames	108	445,240	544,980	884	79	1,252,746

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Products.
Loom furnishers	3	$10,000	$4,954	8	35	$15,400
Loom harness	3	4,600	3,296	6	25	9,712
Loom pickers	2	31,000	25,100	29	......	35,500
Lumber-sawing & planing,	17,895	40,038,427	27,593,529	51,766	452	58,520,966
Machinists & millwrights	1,062	19,225,918	11,367,728	27,834	68	27,998,344
Malt	11	271,800	363,660	73	......	471,035
Matches, friction	60	109,140	137,514	451	540	427,833
Mathematical instruments,	90	326,550	165,666	624	40	703,750
Medicines, drugs, & dyes	143	1,427,375	1,657,886	693	134	3,506,465
Military goods	2	203,000	102,900	74	130	183,600
Milliners	532	660,193	1,496,866	181	3,688	2,761,989
Mill-stones	23	81,835	61,791	87	......	164,570
Mineral water and pop	64	228,650	313,631	570	19	760,489
Morocco cases	5	13,500	14,705	26	10	31,200
Morocco dressers	116	1,387,750	2,286,995	1,796	171	3,861,895
Musical instruments	204	1,545,935	698,168	2,307	24	2,590,715
Nails	87	4,428,498	4,438,976	5,227	4	7,662,144
Oil, lard	41	362,950	1,271,602	182	11	1,617,669
Oil, linseed	168	896,650	1,477,645	477	2	1,948,934
Oil, whale	50	2,791,000	6,492,876	492	52	7,839,950
Oil cloths	56	640,700	829,706	648	2	1,256,994
Paints	4	13,000	5,509	22	......	77,000
Paper	443	7,260,864	5,555,929	3,835	2,930	10,187,177
Patent leather	20	192,100	886,495	687	150	1,368,300
Percussion caps	2	5,000	15,350	9	3	30,000
Perfumes and fancy soap	39	197,550	163,826	125	63	355,350
Pickles and preserves	6	103,000	257,895	125	86	366,100
Pins	4	164,800	137,890	68	297	297,550
Plaster, gypsum	140	410,440	239,063	381	......	428,914
Plumbers	124	646,225	1,297,119	1,037	3	2,343,607
Pork and beef, packing	185	3,482,500	9,451,096	3,267	9	11,981,642
Potteries	484	777,544	275,063	2,246	43	1,466,063
Powder	54	1,179,223	860,997	576	3	1,590,332
Printers, lithographic and copper-plate	26	148,500	59,558	241	134	247,200
Printers and publishers	673	5,862,715	4,964,225	6,989	1,379	11,586,549
Pumps	30	86,370	55,493	148	......	166,919
Pyrotechnists	3	8,500	5,200	18	24	20,900
Red lead	2	20,000	21,130	8	......	27,000
Regalias	6	8,000	36,800	13	70	62,500
Rice mills	4	210,000	1,209,000	200	......	1,462,000
Saddles and harness	3,515	3,969,379	4,427,006	12,598	360	9,935,474
Sails	183	266,380	880,414	838	10	1,654,803
Salt and salt-refining	340	2,640,860	1,051.419	2,699	87	2,177,945
Sash and blinds	433	1,066,355	859,827	2,448	49	2,277,061
Scales and beams, weighers	22	184,000	130,267	402	......	359,505
Sewing-silk	27	428,330	848,945	295	554	1,209,426
Silverware	583	3,828,170	4,920,619	4,873	389	9,401,765
Shingles	620	823,940	406,932	2,127	......	985,957
Ship-building and boats	892	5,162,309	7,286,401	12,623	6	16,595,663
Shoe-pegs	24	35,750	13,238	111	15	73,918
Shot	5	245,500	760,421	69	4	938,550
Slates	6	50,000	13,174	109	......	46,700
Slate-pencils	3	4,600	1,500	19	20	15,000
Spice mills	9	64,300	204,244	55	......	245,405
Starch	146	692,675	799,459	686	8	1,261,468
Stationers	8	113,000	207,775	99	126	332,900
Staves and blocks	99	164,153	190,141	428	......	438,794
Steel furnaces	5	52,300	133,420	40	......	172,080

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Products.
Steel works	2	$32,500	$37,740	11		$53,400
Stone and marble	1,144	4,032,182	2,475,760	9,996	5	8,180,115
Stoves and ranges	230	3,179,475	2,913,943	4,227		6,124,743
Sugar refiners	23	2,669,000	7,662,685	1,644	12	9,898,800
Surgical instruments	87	101,450	60,987	189	111	259,400
Suspenders	5	20,800	75,300	35	327	171,000
Tanners and curriers	6,528	20,602,945	22,863,253	22,451	124	37,702,333
Tin and sheet-iron works	2,280	4,129,567	4,305,389	7,365	28	8,933,188
Thread	5	66,100	31,400	42	57	73,400
Tobacconists	1,418	5,008,295	7,341,728	12,261	1,975	13,491,147
Trunks and carpet-bags	116	356,660	765,816	1,056	264	1,558,388
Turners	440	663,615	407,043	1,624	27	1,374,449
Turners, bone and horn	5	3,500	4,280	24		13,800
Turners, iron	7	17,800	16,907	52		57,000
Turners, ivory	7	30,900	56,880	147		111,880
Turpentine	856	1,663,692	1,494,318	3,390	68	2,855,557
Type & stereotype found's,	42	513,700	298,922	775	224	913,200
Umbrellas	80	761,760	1,399,607	814	1,762	2,506,623
Upholsterers	155	565,685	983,961	804	708	1,790,683
Wall paper	6	49,500	52,335	91	2	107,040
Weavers	153	126,290	234,480	377	155	310,109
Whalebone	11	85,100	285,865	199	1	412,000
Wheelwrights	4,226	3,146,211	1,886,551	11,542	7	6,827,451
Whips and canes	70	198,595	237,643	519	532	575,271
White lead	51	3,124,800	3,541,072	1,508		5,242,213
White and locksmiths	82	144,082	110,155	413	2	355,137
Wire and wire-workers	83	537,725	534,548	658	18	1,033,249
Whiting	6	31,150	33,000	27		76,700
Wool cleaners and pullers,	3	5,000	27,125	11		36,900
Woodenware	197	530,163	436,676	1,328	32	1,138,078
Wool carders	630	739,925	1,251,550	1,071	22	1,789,476
Woolens, carding & fulling,	1,817	26,071,542	24,912,455	29,919	14,976	39,828,557
Aggregate, including sundry miscellaneous manufactures not above enumerated	123,025	$533,245,351	$555,123,822	731,137	225,922	$1,019,106,616

Vast as this production is, we find, ten years later, an increase of more than eighty-six per cent. The total value of the manufactures of the United States for the year ending June 1, 1860, as already ascertained in part and carefully estimated for the remainder, will reach an aggregate value of *nineteen hundred millions of dollars;* and if to this amount was added the very large amount of mechanical productions below the annual value of five hundred dollars,—of which no official cognizance is taken,—the result would indeed be one of startling magnitude.

To produce this large aggregate it is stated that one million one hundred thousand men and two hundred and eighty-five thousand women were furnished employment, or in all one million three hundred and eighty-five thousand persons. Each of these on an average maintained two and a half other individuals, making the whole number of persons supported by manufactures four millions eight hundred and forty-seven thousand five hundred, or nearly one-sixth of the whole population. This was exclusive of the number engaged in the production of many of the raw materials and of food for the manufacturers; in the distribution of their products, such as merchants, clerks, draymen, mariners, the employees of railroads, expresses, and steamboats; of capitalists, various artistic and professional classes, as well as carpenters, bricklayers, painters, and the members of other mechanical trades not classed as manufacturers. It is safe to assume, then, that one-third of the whole population is supported, directly and indirectly, by manufacturing industry. These general facts, therefore, plainly indicate that, in point of productive value and far-reaching industrial influences alone, our manufactures are entitled to a front rank among the great interests of the country.

MANUFACTURES IN 1860.

It is a gratifying fact, shown by the official statistics, that while our older communities have greatly extended their manufactures, the younger and more purely agricultural States, and even the newest Territories, have also made rapid progress. Nor has this department of American industry been cultivated at the expense of any other. There is much reason to believe that it affords the safest guarantee of the permanency and success of every other branch. Evidence bearing upon this point is found in the manufacture of agricultural machines and implements, which is one of the branches that shows the largest increase in the period under review. There is little doubt that the province of manufactures and invention in this case has been rather to create than to follow the demand. The promptness of Americans to adopt labor-saving appliances, and the vast areas devoted to grain and other staples in the United States, have developed the mechanics of agriculture to an extent and perfection elsewhere unequalled. The adoption of machinery to the extent now common in farm and plantation labor furnishes the best assurance that the development of agriculture or manufactures to their utmost can never again justify the old charge of antagonism between them in regard to labor, or injuriously affect either by materially modifying its cost or supply.

AGRICULTURAL IMPLEMENTS.—The total value of agricultural implements made in 1860 was $17,802,514, being an increase of 160.1 per cent. upon the total value of the same branch in 1850, when it amounted to the sum of $6,842,611. This manufacture amounted in New England to over two and three-quarter millions of dollars,—an increase of 65.8 per cent. In the Middle States the value was nearly five and a half millions, having increased at the rate of 122.2 per centum. In the Western States, where the increase was most extraordinary, the value of implements produced was augmented from $1,923,927 to $7,955,545. The increment alone in those States was, therefore, only a fraction less than the product of the whole northern section of the Union in 1850, and was greater by 313 per cent. than their own manufacture in that year. In each of the States of Ohio and Illinois, which are the largest manufacturers in the West, the value of the product exceeded two and a half millions dollars, being an increase in the former of 382 and in the latter of 235 per cent. in ten years. Michigan, Indiana, and Wisconsin increased their production of agricultural implements 1,250, 386, and 201 per cent. respectively. While in some of the Southern States there has been a decrease, in Virginia, Alabama, and Louisiana the increase in this branch has been large; and in Texas, which reported none in 1850, agricultural implements of the value of $140,000 were manufactured in 1860. The whole value produced in the Southern States in the latter year (including cotton-gins) was $1,582,483, exhibiting an increase of over 101 per cent. in the last decade.

IRON AND MACHINERY.—The quantity of pig iron returned by the census of 1860 was 884,474 tons, valued at $19,487,790, an increase of 44.4 per cent. upon the value returned in 1850. Bar and other rolled iron amounted to 406,298 tons, of the value of $22,248,796, an increase of 39.5 per cent. over the united products of the rolling-mills and forges, which in 1850 were of the value of $15,938,786. This large production of over one and a quarter millions of tons of iron, equivalent to ninety-two pounds for each inhabitant, speaks volumes for the progress of the nation in all its industrial and material interests. The manufacture holds relations of the most beneficial character to a wide circle of important interests intimately affecting the entire population,—the proprietors and miners of ore, coal, and limestone lands; the owners and improvers of woodlands, of railroads, canals, steamboats, ships, and of every other form of transportation; the producers of food, clothing, and other supplies, in addition to thousands of workmen, merchants, and capitalists, and their families, who have directly participated in the benefits resulting from this great industry. It has supplied the material for an immense number of foundries, and for thousands of blacksmiths, machinists, millwrights, and manufacturers of nails, hardware, cutlery, edged tools, and other workers in metals, whose products are of immense aggregate value and of the first necessity. The production of so large a quantity of iron, and particularly of bar iron, and the demand for additional quantities from abroad, tell of the progress of the country in civil and naval architecture and all the engineering arts; of the construction of railroads and telegraphs, which have spread like a net over the whole country; of steam-engines and locomotives; of spinning, weaving, wood, and metal-working, milling, mining, and other machinery; and of all the multiform instruments of science, agriculture, and the arts, both of peace and of war; of the manufacture of every conceivable article of convenience or luxury of the household, the field, or the factory. The aggregate statistics of iron exhibit the extent to which the general condition of the people has been improved by this great agent of civilization during the ten years embraced in this retrospect.

The materials for the manufacture of iron—ore, coal, and other fuel, water-power, etc.—are so diffused, abundant, and cheap, that entire independence of foreign supplies appears to be alike desirable and attainable at no distant period.

Probably no class of statistics possesses more general interest, as illustrating the recent progress of the country in all the operative branches, and in mechanical engineering, than those relating to machinery. Nearly every section of the country, particularly the Atlantic slope, possesses a great affluence of water-power, which has been extensively appropriated for various manufacturing purposes. The construction of hydraulic machinery, of stationary and locomotive steam-engines, and all the machinery used in mines, mills, furnaces, forges, and factories; in the building of roads, bridges, canals, railways, etc.; and for all other purposes of the engineer and manufacturer, has become a pursuit of great magnitude. The annual product of the general machinists' and millwrights' establishments, as returned in the census of 1850, was valued at $27,998,344. The value of the same branch, exclusive of sewing-machines, amounted in 1860 to $47,118,550, an increase of over eighteen millions in ten years. The Middle States were the largest producers, having made over 48 per cent. of the whole; but the Southern and Western States exhibit the largest relative increase. The ratio of increase in the several sections was as follows: New England, 16.4 per cent.; Middle States, 55.2; Southern, 387; and Western, 127 per cent. The Pacific States produced machinery of the value of $1,686,510, of which California made $1,609,510. In Rhode Island, the business was slightly diminished, but in Connecticut it had increased 165 per centum. The great facilities possessed by New York and Pennsylvania in iron, coal, and transportation, made them the largest manufacturers of machinery,—which in the former was made to the value of $10,484,868, and in the latter, $7,243,458: an increase of 24.4 and 75 per cent., respectively. New Jersey raised her product to $3,215,673, an increase of 261 per cent.; while Delaware and Maryland and the District of Columbia exhibited an increase of 82, 41, and 667 per cent., respectively. In all the Southern States the value of the manufacture, though small, was largely increased; the ratio in Virginia, the largest producer, being 236 per cent., while in Mississippi, Alabama, and South Carolina, the next in amount of production, it was 1,626, 270, and 525 per cent., respectively. This was exclusive of cotton-gins, which were included with agricultural machinery. Ohio was the largest producer in the West, and the fourth in the Union, having made to the value of $4,855,005, an increase of 125 per cent. on the product of 1850. Kentucky ranked next among the Western States, having produced over one million dollars' worth, and increased her product 213 per cent. The ratio of increase in the other Western States was, in Indiana, 98; in Illinois, 24; Wisconsin, 208; Missouri, 214; and Iowa, 2,910 per cent., respectively; but in Michigan there was a small decrease in the amount manufactured.

Besides a large amount of machinery and other castings included in the returns of machine-shops, the value of the production of iron-foundries returned by the census of 1860 reached the sum of $27,970,193, an increase of 42 per cent. on the value of that branch in 1850, which was $20,111,517. New York, whose extensive stove-foundries swell the amount of production in that State, made to the value of $8,216,124, and Pennsylvania, $4,977,798, an increase of 39 and 60.9 per cent., respectively.

With the subject of iron and its various manufactures that of fossil fuel naturally associates itself. The unequalled wealth and rapid development of the coal-fields of the United States as a dynamic element in our industrial progress affords one of the most striking evidences of our recent advance. The product of all the coal-mines of the United States, in 1850, was valued at $7,173,750. The annual value of the anthracite and bituminous coal, according to the eighth census, was *over nineteen millions* of dollars. The increase was over twelve millions of dollars, and was at the rate of 169.9 per cent. on the product of 1850. It was chiefly produced in Pennsylvania, Ohio, and Virginia. The coal mined in Pennsylvania, in 1850, was valued at $5,268,351. In the year ending June 1, 1860, the State produced 9,397,332 tons of anthracite, worth $11,869,574, and of bituminous coal, 66,994,295 bushels, valued at $2,833,859, making a total value of $14,703,433, or an excess of $7,529,683 over the total product of the Union in 1850. Of bituminous coal, Ohio raised 28,339,900 bushels, the value of which was $1,539,713; and Virginia, 9,542,627 bushels, worth $690,188. The increase in Ohio was $819,587, and in Virginia, $222,780, in the value of mineral fuel, being at the rate of 113 per cent. in the former, and 47.6 per cent. in the latter. The increase in Pennsylvania was 179 per centum on the yield of 1850.

The development of our several valuable mines of coal, iron, lead, copper, zinc, gold, silver, quicksilver, chrome, etc., is a subject of the highest satisfaction, constituting, as they do, the repository and fountain-head of crude materials for an immense and varied industry in the metallurgic and chemical arts. Mining in its several branches employs a very large amount of capital and great numbers of our laborious population, and shows a steady increase in the last ten years. The product of the gold mines in the Atlantic States has, however, fallen off since the discoveries of gold in California.

PRINTING.—The increase of printing-presses in the book and newspaper manufacture has been great beyond all precedent, and has exerted the most beneficent influence by cheapening and multiplying the vehicles of instruction. Its effects are everywhere apparent. Never did an army before possess so much of cultivated intellect, or demand such contributions for its mental food as that now marshaled in its country's defence. Many of these reading-soldiers ripened their intellectual tastes during the last ten years. In fact, many divisions of our army carry the printing-press and type, and the soldiers issue publications and print the forms for official papers. The press is, indeed, the great prompter of enterprise. It constantly travels with the emigrant to diffuse light and intelligence from our remotest frontiers, where it speedily calls into existence the paper-mill and all the accessories which it supports in older communities.

In New England, the Middle, and Western States, the value of book, job, and newspaper printing is returned as $39,428,043, of which eleven millions' worth consisted of books, the value of the latter being nearly equal to the whole product of the same branch in 1850, which was returned at $11,586,549. The manufacture of paper, especially of printing-paper, has increased in an equal ratio, the State of Massachusetts alone producing paper of the value of $5,968,469, being over 58 per cent. of the product of the Union in 1850. New York returned paper of the value of $3,516,276; Connecticut, $2,528,758; and Pennsylvania, $1,785,900.

SEWING-MACHINES AND CLOTHING.—The sewing-machine has also been improved and introduced, in the last ten years, to an extent which has made it altogether a revolutionary instrument. Among the branches of industry which have been signally advanced especially by the introduction of the sewing-machine is the manufacture of men's and women's clothing for sale, which has heretofore ranked with the cotton manufactures in the number of hands (two-thirds of them females) and the cost of labor employed. The increase of this manufacture has been general throughout the Union, and in the four cities of New York, Philadelphia, Cincinnati, and Boston, amounted in value to nearly forty and one-quarter millions of dollars, or over 83 per cent. of the product of the whole Union in 1850. The manufacture of shirts and collars, of ladies' cloaks and mantillas,—a new branch which has received its principal impulse within the last ten years,—and of ladies' and gentlemen's furnishing-goods generally, form very large items in the general aggregate of this branch. They severally employ extensive and numerous establishments, many of them in our large cities, with heavy capital. In Troy, N. Y., the value of shirt-collars alone annually manufactured is nearly eight hundred thousand dollars, approximating in value to the product of the numerous and extensive iron-foundries which have been a source of wealth to that city.

Several branches of manufacture have an intimate relation to agriculture and the landed interests, and by their extension powerfully promote those interests as well as that of commerce. Surpassing all others of this or any other class in the value of products and of the raw material consumed, is the manufacture of flour and meal. The product of flour and grist-mills in 1850 reached a value of nearly one hundred and thirty-six millions of dollars, while in 1860 the returns exhibit a value of $223,144,369,—an increase of $87,246,563, or 64.2 per cent. in the last ten years. The production and increase of the several sections were as follows:

	Value of flour and meal.	Increase.	Per cent. increase.
New England States	$11,155,445	$4,834,959	76.5
Middle States	79.086,411	10,653,232	15 5
Western States	96,038,794	53,364,802	125.0
Southern States	30,767,457	14,185,640	85.5
Pacific States	6,096,262	4,207,930	222.8

The largest mill is in Oswego, N. Y., which in 1860 produced 300,000 barrels of flour; the next two, in Richmond, Va., made 190,000 and 160,000, respectively; and the fourth, in New York city, returned

146,000 barrels. The value of annual production of each ranged from one million and a half to one million dollars.

DISTILLED AND MALT LIQUORS.—The manufacture of spirituous liquors in the United States employed 1,138 distilleries, independent of a large number of rectifying establishments, the product of the former being over eighty-eight millions of gallons, of the value of $24,253,176. The Middle and Western States were the largest producers, the latter yielding nearly forty-five and the former thirty-seven millions of gallons of whisky, high wines, and alcohol, the aggregate value in each section being almost eleven millions of dollars. It is satisfactory to observe, that more than ninety-five per cent. of all the spirits made was from materials of domestic production, a little over four million gallons of New England rum having been the product of imported molasses.

The manufacture of malt liquors, though of less magnitude, and far less pernicious in its effects, shows a still larger increase. It derives its material wholly from agriculture, and its extension promises more substantial benefits to the country than the last.

The Northern States returned 969 breweries, or more than double the number in the Union in 1850. The quantity of all kinds of malt liquors made, including 855,803 barrels of lager beer, was 3,235,545 barrels,—an increase of 175 per cent. upon the total product of 1850, while its value was returned at $17,977,135, being more than three times the amount produced by breweries in that year. Nearly one-half of the whole quantity was made in New York and Pennsylvania. The former had 175 establishments,—45 of them in the city of New York,—and the latter State 172, of which Philadelphia contained 68. The manufacture of lager beer was much increased in all the Middle and Western States, about forty-one per cent. of the whole being the product of the two States last named. Among the Eastern States, Massachusetts, and among the Western States, Ohio, Illinois, and Missouri, were the largest producers of malt liquors. There were 71 breweries in California and eight in Oregon, producing together about seven per cent. of the total value of the manufacture.

COTTON MANUFACTURES.—Among the great branches of pure manufacture in the United States, that of cotton goods holds the first rank in respect to the value of the product and the amount of capital employed. Aided by the possession of the raw material as a product of our own soil, and by the enterprise and ingenuity of our people, this valuable industry has grown with a rapidity almost unrivalled.

The total value of cotton goods manufactured in New England was

$80,301,535, and in the Middle States $26,272,111,—an increase of 83.4 per cent. in the former, and 77.7 in the latter. The remaining States produced to the value of $8,564,280, making the whole production during that year $115,137,926, against $65,501,687, the value of this branch in 1850, or an increase in the general business of nearly seventy-six per centum in ten years. In the States of Maine and New Jersey, the manufacture increased in the same time 152 per cent.; in Pennsylvania, over 102 per cent.; in New Hampshire and Connecticut, over 87 per cent.; in Massachusetts, nearly 69 per cent.; and in Rhode Island, 88.7 per cent. The total production in this branch was at the rate *per capita* of $3.69 for every individual in the Union, equivalent to 46⅛ yards of cloth for each, at the medium price of eight cents per yard. The average product per head in 1850 was 32¼ yards. The increase alone has, therefore, been at the rate of eleven yards for each person, or nearly equal to the average annual consumption *per capita* in 1830, when it was estimated to amount to twelve yards. The number of hands employed in the manufacture in 1860 was 45,315 males, and 73,605 females, an increase in the male operatives of 10,020, and in the female of 10,944 since 1850. The average product of the labor of each operative was $969. The number of spindles was returned at 5,035,798, being an increase of 1,402,105, or 38.5 per cent. over the aggregate in 1850, which was estimated at 3,633,693. The New England States possess 3,059,297, or 78.6 per cent. of the whole, while Massachusetts alone employs 1,739,700, or 29.3 per cent. of the number returned in the Union. The increase of spindles in the last decade was, in New England, 1,208,219, or 30 per cent. In the State of Maine, 186,100, or 163.3 per cent.; in the State of New Hampshire, 229,484, or 52.1 per cent.; in the State of Massachusetts, 451,609, or 35 per cent.; in the State of Rhode Island, 141,862, or 22.7 per cent.; in the State of Connecticut, 211,188, or 83.1 per cent.; while in Vermont it exhibited a decrease.

The product per spindle varies in the different States, partly accounted for by the fact that many manufacturers purchase yarns which have been spun in other States.

The product of cotton-goods per spindle is as follows: in Maine, $22.12; Massachusetts, $21.12; New Hampshire, $24.87; Vermont, $18.13; Rhode Island, $16; Connecticut, $16.46. The average in the New England States is $20.30; in the Middle States, $30.48; and in the whole Union, $22.86.

The quantity of cotton used in the fabrication of the above goods was 364,036,123 pounds, or 910,090 bales of 400 pounds each. Of this amount the New England States consumed 611,738 bales, and Massachusetts alone 316,665. The consumption per spindle in that year in the various States and sections was as follows:

	No. of spindles.	Pounds of cotton.	Pounds per spindle.
Maine	300,000	23,438,723	78
New Hampshire	669,885	39,212,644	58.5
Vermont	19,712	1,057,250	53
Massachusetts	1,739,700	126,666,089	72.8
Rhode Island	766,000	38,521,608	50.2
Connecticut	464,000	15,799,140	34
In New England	3,959,297	237,844,854	61.8
In the Middle States	861,661	76,055,666	88.26
In the United States	5,035,798	364,036,123	72.2

When we consider the large number of hands, and especially of women and children, who find employment in this business, the quantity of raw material, of machinery, and of fuel, exclusively of American production, employed in this branch, and the amount of comfortable clothing and household stuffs supplied at cheap rates, or the amount it contributes to the internal and foreign commerce of the Union, its progressive increase is a subject of the highest satisfaction, and its growth both here and abroad is one of the marvels of the nineteenth century.

WOOLEN, LINEN AND SILK MANUFACTURES.—The returns of woolen manufactures show an increase of over fifty-one per cent. in ten years. The value of woolen and mixed goods made in 1850 was $45,281,764. In 1860 it amounted to $68,865,963. The establishments numbered 1,909, of which 453 were in New England, 748 in the Middle, 479 in the Western, two in the Pacific, and 227 in the Southern States. The aggregate capital invested in the business was $35,520,527, and it employed 28,780 male and 20,120 female hands, 639,700 spindles, and 16,075 looms, which worked up more than eighty million pounds of wool, the value of which, with other raw materials, was $40,360,300. The foregoing figures include satinets, Kentucky jeans, and other fabrics of which the warp is cotton, though usually classed with woolens. In the manufacture of these mixed goods the amount of cotton consumed is 16,008,625 pounds, which, with 364,036,123 pounds used in making cotton-goods, as previously stated, amounts to 380,044,748 pounds, or 950,112 bales, exclusive of a considerable quantity used, annually, in household manufactures, and for various other purposes.

The largest amount of woolens was made in New England, where the capital was nearly twenty millions of dollars, and the value of the product

$40,850,497, but little less than the total value in 1850. Nearly one-half the capital and product of New England belonged to Massachusetts, which had 138 factories of large size. Rhode Island ranked next, and had increased its manufacture 176 per cent. in ten years, that of Massachusetts being 53.85 per cent. The value of Woolens produced in the Middle States was $16,182,066, in the Western $4,357,842, in the Pacific $242,000, and in the Southern $2,608,855. The sectional increase was—in New England 61.81, in the Middle States 8, in the Western States 10.6, and in the South 135, the last showing the greatest relative increase. Pennsylvania, next to Massachusetts, was the largest producer, having 309 factories, which made $8,279,218 worth of woolen and mixed fabrics, an increase of 42.9 per cent. The largest portion was the product of 222 establishments in the city of Philadelphia.

In Ohio, which produced in 1850 a greater value of Woolens than all the other Western States, there was a decrease on the product of 1850, owing probably to the shipments of wool to Europe, which in 1857 was found to be the most profitable disposition of the rapidly-increasing wool crops of that State. In Kentucky, now the largest manufacturer of woolens in the West, the product was $1,164,761, and the increase in ten years 44.9 per cent.; while in Indiana it was 51.6 per cent., in Missouri 27.9, and in Wisconsin 25.9 per cent. on the product of 1850.

The extension of this important manufacture is a subject of great interest to the country, inasmuch as our climate renders woolen clothing necessary throughout a large part of the Union during much of the year; and because it would supply the best market to the wool-grower. The quantity of wool returned for the whole Union in 1850 was upwards of fifty-two and a half millions of pounds. Sheep-raising has been greatly extended and improved since that date in Ohio, Texas, California, and other States, and the clip in 1860 amounted to 60,511,343 pounds, an increase of 15.2 per cent. in ten years. The yield still falls far short of the consumption, and large quantities continue to be imported, notwithstanding the amount of territory adapted to sheep husbandry.

The manufacture of linen goods has made but little progress in this country. A few mills, chiefly in Massachusetts, make crash and other coarse fabrics; the largest two in that State produced six million yards in 1860. Others are extensively engaged in making twines, shoe and other threads. It is to be regretted that the manufacture of flax has not attained greater magnitude in a country where the raw material is so easily and cheaply grown. Farmers throughout the West have raised the crop simply for the seed, and thrown out the fibre as valueless.

The manufacture of fabrics from flax cotton has been commenced, and success in a new branch of industry is confidently expected. The inventive genius of our countrymen has perfected machinery for the preparation of flax for spinning, which can be furnished, it is alleged, at as low a rate as the product of southern cotton-fields.

The manufacture of sewing-silks is extensively carried on in this country. Including tram, organzine, etc., the production exceeded five million dollars in the States of Connecticut, New Jersey, Massachusetts, Pennsylvania, and New York,—their relative values being in the order mentioned. Ribbons are made to a small extent, but the chief manufactures of silk consist of ladies' dress-trimmings, coach-lace, etc., of which the cities of Philadelphia and New York produce to the value of $1,260,725 and $796,682, respectively.

LEATHER.—The production of leather is also a leading industry of much importance to the agriculturist and stock-raiser, as well as to the commercial interest, inasmuch as it consumes all the material supplied by the former, and feeds an active branch of our foreign import trade. The tanning and currying establishments of the United States produced in 1850 leather, exclusive of Morocco and patent leather, to the value of $37,702,333. The product of the same branch in 1860 reached $63,090,751, an increase of nearly sixty-seven per centum. In the New England States it was $16,338,871; in the Middle States, $36,344,548; and in the Western States, $5,986,457,—being an increase of 66.6 per cent., 90.7, and 13.3 in those sections, respectively. The Pacific States and Territories, (including Utah,) which returned no leather in 1850, produced in 1860 to the value of $351,469. The largest producers of leather are, New York, $20,758,017; Pennsylvania, $12,491,631; and Massachusetts, $10,354,056,—an increase in those States of 111.7, 98.4, and 82.3 per cent., respectively. Including Morocco and patent leather, the aggregate value produced in the Union in 1860 exceeded sixty-seven millions of dollars.

If we add to the sum total of this manufacture the aggregate value of all the allied branches into which it enters as a raw material, or take an account of the capital, the number of hands, and the cost of labor and material employed in the creation and distribution of its ultimate products, it is doubtful if any other department of industry is entitled to precedence over that of leather.

BOOTS AND SHOES.—The manufacture of boots and shoes employs a larger number of operatives than any other single branch of American industry. The census of 1850 showed that there were 11,305 establishments, with a capital of nearly thirteen millions of dollars, engaged in making boots and shoes to the value of $53,967,408, and employing 72,305 male and 32,948 female hands. The returns of 1860 show that 2,554 establishments in the New England States employed a capital only $2,516 less than that of the whole Union at the former date; and with 56,039 male and 24,978 female employees produced boots and shoes of the value of $54,767,077, or eight hundred thousand dollars more than the entire value of the business in 1850, and 82.8 per centum in excess of their own production in that year. Massachusetts increased 92.6 per cent., having made boots and shoes of the value of $46,440,209, equal to 86.6 per cent. of the general business in 1850. The State of New York returned 2,276 factories, with an aggregate production of $10,878,797; and New England, New York, Pennsylvania, and New Jersey together produced $75,674,946 worth of these articles, being 40.4 per cent. more than the product of all the States in 1850, and 67.9 per cent. more than their own manufacture in that year. The three counties of Essex, Worcester, and Plymouth, in Massachusetts, produced boots and shoes to the value severally of about 14½, 9½, and 9¼ millions of dollars. The largest production of any one town was that of Philadelphia, in which it amounted to $5,329,887; the next that of Lynn, Mass., was $4,867,399; the third, Haverhill, $4,130,500; the fourth, New York city, $3,869,068. The largest production of a single establishment was of one in North Brookfield, Mass., and amounted to over seven hundred and fifty thousand dollars. This establishment was the largest of five the same proprietors had in operation that year, the total production whereof was over one million pairs of boots and shoes, valued at more than thirteen hundred thousand dollars! Machinery propelled by steam-power is now used in many large manufactories with highly satisfactory results.

CABINET-WARE.—The value of cabinet-furniture made in 1860 in the New England, Middle, and Western States, reached the sum of $22,701,304, an increase of 39.8 per cent. over the product of those States in 1850, and exceeding the production of the whole Union in 1850. New York returned in 1860 furniture of the value of $7,175,060, (or 40.6 per cent. of the whole amount made in 1850,) Massachusetts, $3,365,415, and Pennsylvania, $2,938,503. The growth of this branch keeps pace with the increase of population and wealth, and serves to swell the amount of our exports. It gives employment at remunerative prices to skilled labor, which it attracts from the crowded labor-markets of Europe.

PIANOS AND MUSICAL INSTRUMENTS.—Our advance in wealth and refinement is attested by the rapid increase in the manufacture of Pianofortes and other Musical Instruments. New England, New York, and Pennsylvania produced musical instruments to the value of $5,791,807,—an increase of 150 per cent. over their own production in 1850, and 124 over the whole value of that branch in the Union in the same year. New York alone made $3,392,577 worth, being $811,862 more than the whole amount returned in 1850. In this branch our manufacturers have achieved marked success. Without claiming for them superiority over their brethren in France and Germany, it is admitted that church organs and other instruments made in this country are better suited to the climate, and, in other respects, fully equal to those which come from the most celebrated establishments in Europe.

JEWELRY AND WATCHES.—The increased amount of the precious metals and the greater ability of all classes to indulge the promptings of taste or luxury, have added greatly to the manufacture of Jewelry, and of all kinds of gold, silver, and plated wares. In the New England and Middle States, the production of jewelry and watches reaches over eleven millions in value; of silver, silver-plated wares, etc., over six and one-half millions; making nearly eighteen millions of dollars, exclusive of gold-leaf and foil, and the assaying and refining the precious metals, exceeding the product of the whole Union, in 1850, by $7,016,908 in value,—an increase of over sixty-four per cent., and of seventy per cent. on the production of those States in that year. The production of cheap jewelry has been greatly augmented by recent improvements in electro-metallurgy.

The manufacture of American Watches—commenced within the last ten years in Boston as an experiment—has proved eminently successful. Unable heretofore to compete with the low-priced labor of European workmen, our ingenious countrymen have perfected machinery by the aid of which watch movements are fabricated equal, if not superior, to the hand-made. The continued growth of this branch will diminish the importation of foreign watches, and may, at no distant period, earn for our country a reputation in this manufacture equal to that she enjoys in the kindred branch of clock-making. Gold and silver watch-cases are now produced to a very large extent, chiefly in the cities of Philadelphia, New York, and Newark.

CHEMICALS AND GAS.—Improvements in technical Chemistry have added largely to the number and value of its products. The manufacture of articles strictly classed as chemical, exclusive of white lead, ochres, paints, varnish, glue, perfumes, cements, pot and pearl ashes, etc., amounted, in 1850, to the value of nearly five millions of dollars. The production, in 1860, exhibited a considerable increase. This branch is susceptible of almost unlimited extension and application in the creation of commercial and useful articles from the refuse of every other manufacture, and the diversified products, vegetable, animal, and mineral, of our own or other lands. Many of the chemical branches, apart from the money-value of their manufactures, are of the highest economical importance to our country, as auxiliaries to almost every other industry of the people. Chemistry has as yet revealed but a tithe of the vast wealth of its resources.

The manufacture and consumption of Gas for illumination and other purposes, which is one of the remarkable fruits of chemical science, has been greatly increased, not only in our Northern cities, but in the large towns and villages throughout the Union. The quantity returned is but four thousand million feet of the value of eleven million dollars; but the whole quantity made exceeded 5,000,000,000 cubic feet, the value of which was about thirteen millions of dollars.

PETROLEUM.—An important development of the natural resources of the country, and a valuable addition to its exports, have been made by the discovery, within two or three years, that certain indications known to the aboriginal and early European inhabitants of the Western country, of natural reservoirs of inflammable oil existing upon the head-waters of the Alleghany River in New York and Pennsylvania were but the clue to apparently inexhaustible supplies of native oil, accessible at no great depth throughout an extended belt of country, embracing the bituminous coal-measures of several States.

As a product of our own country this remarkable substance was brought to the notice of the white population as early as the middle of the last century, by the Seneca Indians, who found it upon Oil Creek, a branch of the Alleghany, in Venango County, Pennsylvania, and near the head of the Genesee River, in New York, whence it received the name of "Seneca oil" and "Genesee oil." It was used by the natives in their religious ceremonies, and as a medicament for wounds, etc. For the last-named purpose it has been long collected and sold in small quantities at a high price. But its existence in any vast amount appears to have been unknown until 1845, when a spring was "struck," while boring for salt, near Tarentum, thirty-five miles above Pittsburg, on the Alleghany. Experiments having proved its constituents to be nearly the same as those of the artificial carbon oil, a company was organized in New York to attempt its purification by the same process applied to the latter. But little was effected, however; and in 1857 Messrs. Bowditch and Drake, of New Haven, commenced operations at Titusville, on Oil Creek, where traces of early explorations were found, and in August, 1859, a fountain was reached by boring, at the depth of seventy-one feet, which yielded 400 gallons daily. Before the close of the year 1860 the number of wells and borings was estimated to be about two thousand, of which seventy-four of the larger ones were producing daily, by the aid of pumps, an aggregate of eleven hundred and sixty-five barrels of crude oil, worth, at twenty cents a gallon, about ten thousand dollars. Wells were soon after sunk to the depth of five or six hundred feet, and the flow of petroleum became so profuse that no less than 3000 barrels were obtained in a day from a single well, the less productive ones yielding from fifteen to twenty barrels per diem. In several instances extraordinary means were found necessary to check and control the flow, which is now regulated in such wells according to the state of the market by strong tubing and stop-cocks. The quantity sent to market by the Sunbury and Erie Railroad from the Pennsylvania oil region, which has thus far been the principal source, increased from 325 barrels in 1859 to 134,927 barrels in 1861. The whole quantity shipped in the last-mentioned year was nearly 500,000 barrels. Since August, 1861, the product has rapidly increased. The present capacity of the wells is estimated at 250,000 to 300,000 barrels per week. So important, however, have the operations in this article become that a railroad, we understand, has been chartered in Pennsylvania exclusively for the transportation of the oil to market. From a recent number of the *Register*, a newspaper published at Oil City, Pennsylvania, we copy the following statement respecting the product of petroleum in that vicinity: "We learn that the number of wells now flowing is seventy-five, the number of wells that formerly flowed and pumped is sixty-two; the number of wells sunk and commenced is three hundred and fifty-eight; total, four hundred and ninety-five. The amount of oil shipped is set down at 1,000,000 barrels; amount on hand to date, 92,450 barrels; present amount of daily flow, 5,717 barrels. The average value of the oil, at $1 per barrel, is $1,092,000; average cost of wells, at $1000 each, is $495,000; machinery, building, etc., from $500 to $700 each, $500,000. The total number of refiners is twenty-five. The detailed report of the condition of the wells shows that production is on the increase. Holders are firm at fifty cents per barrel at the wells, and don't seem to care about selling any great amount at that price." With increased facilities for getting it to the seaboard at a cheap rate for transportation, the operations will doubtless become much more extended than at present.

RIFLES AND PISTOLS.—Our improved fire-arms, especially rifles and pistols, have obtained a reputation not alone in Europe, but in Africa, Asia, and the islands of the sea. The traveler finds that his revolvers of American invention and manufacture exert a salutary influence on the Bedouin and the robber.

The machinery for making the various parts of rifles and other fire-arms, which, in its automatic exercise, seems almost endowed with reasoning faculties, owes its origin to the inventive genius of New England. The Enfield rifle was transplanted to England by a son of Vermont, under whose superintendence the arms were made. And even the Armstrong gun, which obtained for its reputed inventor the honor of knighthood, was invented in this country; for a model was submitted and the principle demonstrated to scientific gentlemen in Harvard College anterior to its appearance in Great Britain.

In the year preceding June 1, 1860, a year devoted to peaceful pursuits, the manufacture of fire-arms was limited, and yet two establishments in a single city of Connecticut produced to the value of over one million of dollars. Had the national inventory been taken two years later, the magnitude of this and kindred branches of manufacture, stimulated by the necessities of the country, would have excited astonishment.[1]

STATEMENT OF THE LEADING MANUFACTURES, AND THE VALUE OF PRODUCT OF EACH FOR THE YEAR ENDING JUNE 1, 1860.

Flour and meal	$224,000,000	Sugar refining	38,500,000
Cotton goods	115,000,000	Iron founding	28,500,000
Lumber	96,000,000	Spirituous liquors	25,000,000
Boots and shoes	90,000,000	Cabinet furniture	24,000,000
Leather, including morocco and patent leather	72,000,000	Bar and other rolled iron	22,000,000
Clothing	70,000,000	Pig iron	19,500,000
Woolen goods	69,000,000	Malt liquors	18,000,000
Machinery, steam engines, etc	47,000,000	Agricultural implements	17,800,000
Printing: book, job, and newspaper	42,000,000	Paper	17,500,000
		Soap and candles	17,000,000

If we were to attempt an investigation of the influences which have contributed to this wonderfully luxuriant expansion of industry in manufactures, we would mention primarily and especially the remarkable activity of the American mind manifested in inventions and discoveries in

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(1) The first rifles made by machinery to use the Minie ball, or its equivalent, were made at Hartford, Connecticut, and Windsor, Vermont, for the English Government. The machinery and tools for the armory at Enfield, England, were made at Windsor, Vermont; Hartford, Connecticut; and Chicopee, Massachusetts. Robbins & Lawrence did most of the work on such machinery and tools, and James T. Ames, Agent of the Chicopee Works, got out the stocking machinery, and some other parts.

the arts and sciences. As early as 1857, the number of patents issued to American inventors had grown to exceed those granted by the English office, and the number of applications was greater than in France, though in both those countries there is no rigid preliminary examination of applications, and nearly all patents applied for are granted. The contrast, however, in this particular, between America and Russia is much more marked. In Russia there were but 97 patents granted in the years 1852–1854, of which 56 only were issued to natives of the empire, being an average of about 19 per annum in a population of sixty-nine millions. For twelve months, ending November, 1857, the patents granted amounted to 24, of which but 13 were to natives of the country; while in the United States, within the same period, there were over 4500 applications filed and 2900 patents granted. In a single year there were 116 patents issued for improvements upon a single machine, —the Sewing Machine.

In analyzing the character and objects of the various inventions that have been patented, we find—as, indeed, one would expect from the peculiar circumstances of society existing in this country, in consequence of its comparatively recent settlement—that much the largest proportion of them are of a utilitarian and labor-saving character. Of the 2900 patents issued in 1857, 438 were for agricultural implements and processes, including as such, Cotton-gins, Rice-cleaners, and Fertilizers; and of the 3710 patents issued in the succeeding year, 510 were for inventions relating to agricultural implements and processes, of which 152 were for improvements in Reaping and Mowing Machines; 42 for improvements in Cotton-gins and Presses; 164 for improvements in the Steam-engine; and 198 for improvements in Railroads and Railroad Cars. The unceasing demand has been for agencies that would enable man to extract from the material world the largest amount of the elements of human comfort with the least expenditure of physical labor, though the genius of our countrymen has not by any means been confined exclusively to the invention and improvement of machines and processes of manufacture. Within a few years very many designs and patterns have been patented; and we are encouraged to hope that American artizans will soon be able to compete with those of other and older countries in the production of those pleasing forms, figures, and designs which adapt and recommend certain kinds of manufactured fabrics to people of cultivated taste.

In measuring the relative rank of the States of this Union by the tape-line of the ingenuity of their citizens, we find that New York stands first, Pennsylvania second, Massachusetts third, Ohio fourth, Connecticut fifth, and Illinois sixth. Thus, of the 8668 persons who received patents in 1858, nearly one third, or 1076, were citizens of New York; 447 of Pennsylvania; 438 of Massachusetts; 302 of Ohio; and 211 of Connecticut; and of the 4491 patentees in the succeeding year, 1237 were citizens of New York; 532 of Pennsylvania; 492 of Massachusetts; 390 of Ohio; 256 of Connecticut; and 206 of Illinois. The following table exhibits

THE BUSINESS OF THE PATENT-OFFICE FOR TWENTY-FOUR YEARS ENDING DECEMBER 31, 1861.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	....	....	435	$29,289.08	$33,506.98
1838	....	....	520	42,123.54	37,402.10
1839	....	....	425	37,260.00	34,543.51
1840	765	228	473	38,056.51	39,020.67
1841	847	312	495	40,413.01	52,666.87
1842	761	291	517	36,505.68	31,241.48
1843	819	315	531	35,315.81	30,776.96
1844	1,045	380	502	42,509.26	36,344.73
1845	1,246	452	502	51,076.14	39,395.65
1846	1,272	448	619	50,264.16	46,158.71
1847	1,531	533	572	63,111.19	41,878.35
1848	1,628	607	660	67,576.69	58,905.84
1849	1,955	595	1,070	80,752.78	77,716.44
1850	2,193	602	995	86,927.05	80,100.95
1851	2,258	760	869	95,738.61	84,916.93
1852	2,639	996	1,020	112,056.34	95,916.91
1853	2,673	901	958	121,527.45	132,869.83
1854	3,324	868	1,902	163,789.84	167,146.32
1855	4,435	906	2,024	216,459.35	179,540.33
1856	4,960	1,024	2,502	192,588.02	199,931.02
1857	4,771	1,010	2,910	196,132.01	211,582.09
1858	5,364	943	3,710	203,716.16	193,193.74
1859	6,225	1,097	4,538	245,942.15	210,278.41
1860	7,653	1,084	4,819	256,352.59	252,820.80
1861	4,643	700	3,340	137,354.44	221,491.91

In view of this wonderful increase in the business of the Patent-office, a late Commissioner was justified in saying the inventive genius of the country, great as have been its efforts and attainments, has manifested none of the languor of exhaustion, nor testified any inclination for repose. Each discovery made, like a fire kindled in a dark place, while enlarging the horizon of science, has laid bare yet other and wider fields to be traversed by its ever-brightening sway.

Reviewing the triumphs of invention and discovery in every department of the arts and sciences for the last three-quarters of a century, and in marking their beneficent influences in softening the asperities and exalting the dignity of human labor, there is abundant cause for heartfelt exultation.

A LIST OF THE MOST IMPORTANT AMERICAN INVENTIONS PATENTED FROM 1850 TO 1862 INCLUSIVE.

1850

In 1850, Samuel Eccles of Philadelphia patented his improvement in Looms for Figured Fabrics; Perry Goodhue, of Cincinnati, Ohio, his improvement in Air-heating Stoves; Mertoun C. Bryant, Lowell, Mass., his improvement in Looms for weaving Piled Fabrics; E. W., H. F. & A. H. Tingley, Providence, R. I., their improvement in Machines for sawing Marble; Asa Whitney, of Philadelphia, an improvement in Cast Iron Car-wheels; Isaac Adams, of Boston, an improvement in Printing Presses and Paper Machines; James Bogardus, New York, his new construction of the Frame, Roof, and Floor of Iron Buildings; Jordan L. Mott, New York, an improvement in Cooking Stoves; Lemuel Gilbert, Boston, Mass., an improvement in Upright Piano-fortes; S. H. Ransom, Albany, N.Y., an improvement in the construction of Cooking Stoves; Wm. R. Nevins, New York City, his improvement in Machines for cutting Crackers; Samuel Colt, Hartford, Conn., an improvement in Repeating Fire-arms; Samuel V. Merrick, Philadelphia, his improvement in the Direct-action Steam Hammer; E. B. Bigelow, Clinton, Mass., his improvement in Looms for weaving Tapestry and Brussels Carpets; James C. Booth, Philadelphia, his improvement in Processes for Refining Gold; George Wright, Washington, D.C., his improved Machine for forming and charging Percussion-Caps; Fowler M. Ray, New York City, his improved India-Rubber Spring; Nathan Washburn, Worcester, Mass., his improvement in Cast Iron Car-wheels; George K. Snow, Boston, Mass., his improved Machine for folding Papers; Thomas J. Sloan, New York, an improved Machine for nicking the Heads of Wood-screws; Allen B. Wilson, Pittsfield, Mass., an improvement in Sewing Machines; Gardner Chilson, Boston, Mass., an improvement in Air-heating Furnaces; Samuel and Morton Pennock, Kennet Square, Penn., their improvement in Seed Planters; Frederick R. Robinson, Boston, Mass., his improvement in Sewing Machines; Joseph Conant and Lucius Dimick, Northampton, Mass., their improvements in Machinery for Doubling and Twisting Silk; Samuel T. Thomas, Lowell, and Edward Everett, Lawrence, Mass., their improvement in Looms for weaving Figured Fabrics; Charles Carnell, Philadelphia, his improvement in Brick Presses; Gail Borden, Jr., Galveston, Texas, his Preparation of Portable Soup Bread; Jesse Carpenter, Hartford, Conn., his improvements in Machinery for spinning Yarn and making Rope.

1851

In 1851 a patent was granted Sheldon Northrop, New Milford, Conn., for an improved Loom for weaving Seamless Bags; to Stephen P. Ruggles, Boston, Mass., for an improvement in Printing Presses; to J. Stuart Gwynne, New York City, for an improved Rotary Pump; to Wm. Field, Jr., Providence, R.I., for an improved Hydraulic Ram; to Wm. O. Grover and Wm. E. Baker, Roxbury, Mass., for an improvement in Sewing Machines, now known as the Grover & Baker Machine; to E. H. Ashcroft, Boston, Mass., for his Insulated Plug for Steam Boilers; to Daniel H. Southworth, New York, for an improvement in Planing Machines; to John W. Nystrom, Philadelphia, for an improvement in Calculating Machines; to R. Stilwell, New York City, and E. L. Brundage, Troy, N.Y., for an improvement in Car-seats; to Rufus Bixly, Cyrus S. Bixly, and John Garst, Dayton, Ohio, for an improved Planing Machine; to Isaac Van Karan, Boston, Mass., for an improvement in Cast Iron Car-wheels; to Otis Boyden, Newark, N.J., for an improvement in Alloys of Iron, Zinc, and Nickel; to Edward Maynard, Washington, D.C., for an improvement in Breech-loading Fire-arms; to Robert Newell, New York City, for improvements in Permutation Safety Locks; to George H. Corliss, Providence, R.I., for an improvement in Governors and Cut-off Gear; to George P. Gordon, New York, for an improvement in Printing Presses; to John McAdams, Boston, Mass., for a Paging Machine; to Isaac M. Singer, New York, for an improvement in Sewing Machines; to Allen B. Wilson, Watertown, Conn., for the same; to George Bacon and Richard Raven, New York, for an improvement in Horizontal and Square Piano-fortes; to James H. Swett, Concord, N.H., for improvements in Spike Machinery; to John Ericsson, New York, for an improvement in Air Engines; to George W. Beardslee, Albany, N.Y., for improvement in Planing Machines; to Richard Kitson, Lowell, Mass., for an improvement in Card Grinders; to Cyrus Baldwin, Manchester, N.H., for improvements in Looms for weaving Bags; to Nathan Stark, Albany, N.Y., for an improvement in Bolt-heading Machines; to Richard Sands Tucker, Brooklyn, N.Y., for improvements in spinning Rope Yarns; John Ames and George L. Wright, Springfield, Mass., for an improved Paper-ruling Machine; to Nelson Goodyear, for a combination called Hard Rubber.

1852

In 1852 a patent was issued to Benjamin Maillefert, New York City, for an improvement in blasting Rocks under Water; one to Simeon Savage, Lowell, Mass., for an improvement in Machines for printing Floor Cloths; one to Charles Lennig, Philadelphia, for an improvement in the treatment of Hydro-Sulphurets and in manufacturing Carbonates and Sulphur Compounds; to John McCollum, New York, for an improvement in Cracker Machines; to Barton H. Jenks, Bridesburg, Penn., for improvements in Looms for weaving Figured Fabrics; to Wm. H. Lindsay, New York, for improvements in Fluid Meters; James S. Brown, Pawtucket, R.I., for an improvemont in Turning Engines; to Cullen Whipple, Providence, R.I., for improved Screw-threading Machinery; to Robert Eastman, Concord, N.H., for an improvement in Machines for dressing Stone; to John Goulding, Worcester, Mass., for an improvement in Jacquard Looms; to George S. G. Spence, Boston, Mass., for an improvement in Hot-air Furnaces; to Benjamin S. Stedman, West Meriden, Conn., for an improved Machine for manufacturing Porte-monnaies; to Charles Foster, Cincinnati, Ohio, for an improvement in Hand Printing Presses; to C. Sharpe, Hartford, Conn., for an improved Method of priming Fire-arms; to Francis Wolle, Bethlehem, Penn., for an improvement in a machine for making Bags of Paper; to John H. Marony, Waddam's Grove, Ill., for an improvement in Harvesters; to Royal E. House, for an improvement in the Magnetic Telegraph; D. D. Allen, Adams, for an improved Tool for cutting Pegs from the inside of Boot-soles, being a float attached to a standard by means of a pin or pivet, allowing the float or cutter to adjust itself to the right cutting position, whether working at the heel or toe of the boot.

1853 In 1853 a patent was issued to William and Matthias Stratton, Philadelphia, for an improvement in Portable Gas Apparatus; to N. A. Boynton, Boston, Mass., for an improvement in Hot-air Furnaces; to John J. Greenough, Boston, for an improvement in the manufacture of Plate Glass; to R. L. Hawes, Worcester, Mass., for improvements in Envelope-folding Machines; to E. H. Ashcroft, Boston, for an improvement in Pressure Gauges; to P. N. Receveur, Philadelphia, for an improved Rose Engine; to John Farrel, Philadelphia, for an improvement in lining Fireproof Safes; to Ephraim Treadwell, for an improvement in Ovens; to William H. Mitchell, Brooklyn, N.Y., for an improvement in a Machine for distributing and composing Type; to Uriah A. Boyden, Boston, Mass., for an improvement in Turbines and Hydraulic Motors; to Halvor Halvorson, Hartford, Conn., for an improvement in Looms for weaving Haircloth; to David Stuart, Philadelphia, for improvements in annealing Hollow Ironware; to Ephraim L. Pratt, Worcester, Assignor to James Sargent and Daniel P. Foster, Shelburn, Mass., for an improved Machine for paring Apples; to Wm. Mason, Taunton, Mass., for an improvement in Power Looms; to Chancy O. Crosby, New Haven, Conn., for improvements in Machinery for Sticking Pins; to David Matthew, Philadelphia, for improved Spark Burner and Water Heater for Locomotives; to Benjamin F. Stevens and Walter Kidder, Lowell, Mass., for a Shingle Machine; to Wm. H. Towers, Philadelphia, for improvements in Metallic Pens, Horse Shoes, and Hot-air Registers.

1854

In 1854 a patent was granted to Edward Bancroft and Wm. Sellers, Philadelphia, for an improvement in Turning Lathes; to John and Wm. McAdams, Boston, for improvements in Machines for ruling Paper; to Jonathan Knowles, Trenton, N.J., for an improvement in processes of treating Vegetable Fibre; to J. L. Burdick, New York City, for an improved Paging Machine; to John T. Foster, Jersey City, for an improved Stone-picking Machine; to D. & H. Stearns, Pittsfield, Mass., for an improvement in stretching and drying Cloth; to Lewis Fagin, Cincinnati, Ohio, for an improvement in Smut Machines; to Otis Avery, Honesdale, Penn., for an improvement in Sewing Machines; to Nelson Gavit, Philadelphia, for improvement in Machinery for cutting Paper; to Jonathan & George W. Prescott, Boston, Mass., for a Machine for reducing Wood to Slivers; to Charles A. Reed, Waterloo, N.Y., for an improvement in Self-heating Smoothing Irons; to Charles G. Sargent, Lowell, Mass., for an improvement in Machinery for Combing Wool; to Peter Teal and Charles Tyler, Assignees to W. P. Cresson & Co., Philadelphia, for an improvement in Lathes for turning the Interior Surface of Hollowware; to John P. Hayes, Philadelphia, for improvements in Hot-air Furnaces; to Isaac M. Singer, New York, for an improvement in Sewing Machines; to Edward P. Day, New York, for an improvement in Machines to print Subscribers' Names on Newspapers, etc.; to Hyman L. Lipman, Philadelphia, for an improved Eyelet Machine; to N. Faas, Philadelphia, for improvement in the construction of Accordeons; Thomas Crossley, Boston, Mass., for an improved Machine for printing Woolen and other Goods; to Charles E., John and Samuel Wetherill, Baltimore, for application of Ordinary and Superheated Steam combined for Heating Purposes; to Abraham Gesner, Williamsburg, N.Y., for an improvement in Kerosene Burning Fluid; to John A. Pitts, Buffalo, N.Y., for an improvement in Horse-powers; to T. B. Woodward, Philadelphia, for an improvement in Mills for grinding; to George Francis Wilson, and James Monroe Whitney, Providence, R.I., for an improvement in Machines for threading Screws; to Eli Whitney, Whitneysville, Conn., for an improvement in Fire-arms; to John A. Bradshaw, for improvement in Machines for pegging Boots and Shoes; to Nathaniel A. Boynton, New Jersey, for an improvement in Hot-air Furnaces; to Jacob Senneff, Philadelphia, for an improvement in Machines for casting Metallic Eyes or Mail of Treddles for Looms; to Henry B. Myer, Buffalo, N.Y., for a Mode of constructing the Backs of Car-seats into Beds or Lounges; to Gardner Chilson, Boston, for an improved Hot-air Furnace; to H. Hochstrasser, Philadelphia, for an improved Machine for paging Books; to Robert Boyack, Poughkeepsie, N.Y., for an improvement in Machinery for softening Hemp and Flax; to Barton H. Jenks, Philadelphia, for an improvement in Looms; to Ephraim Brown, Lowell, Mass., for an improved Burglar's Alarm; to John Harris, Lansingburgh, John B. Scott, and Galen Richmond, Troy, N.Y., for an improvement in Machinery for making Rope and Cordage; to Richard Kitson, Lowell, for an improvement in Machinery for picking Cotton and other Fibrous substances; to C. Parham, Philadelphia, for an improvement in Sewing Machines; John A. Roebling, Trenton, N.J., for an improvement in manufacturing Wire Rope; to John T. Hammill, Philadelphia, for an improvement in Railroad-car Seats; to T. T. Tasker, Philadelphia, for a mode of regulating the Furnaces of Hot-water Apparatus; to Wm. W. Cumberland, Newark, N.J., for an improvement in Machines for bending Metals; to Wm. Lyon, Newark, N.J., for an improvement in Sewing Machines.

1855

In 1855 a patent was issued to Thomas H. Burley, Cincinnati, Ohio, for a Dove-tailing Machine; to Wm. F. Warburton, Philadelphia, for an improvement in Hats; to John A. Reed, New York, for an improvement in Oscillating Engines; to John Sutton, New York City, for an improved Lubricator for Steam Engines; to H. J. Brunner, Nazareth, Penn., for an improved Instrument for cutting out Slate or other Stone from quarries; to E. K. Root, Hartford, Conn., for an improved Compound Rifling Machine; to Newell A. Prince, Brooklyn, N.Y., for an improved Fountain Pen; to John H. Manny, Rockford, Ill., for an improvement in Harvesters; to Samuel Wetherill, Bethlehem, Penn., for an improvement in Apparatus for separating Zinc White; to Charles Miller, New York, for improvements in Machines for making Butt Hinges; to John P. Cowing, Seneca Falls, N.Y., for a device for Air-chamber Pumps; Isaac W. Hoagland, Jersey City, for Ship Augers; to Rollin White, Hartford, Conn., for improvements in Repeating Fire-arms; to Alexander B. Latta, Cincinnati, Ohio, for an improvement in Steam Generators; to Robert Rennie, Lodi, N J., for an improvement in Machines for dressing Lawns; to Jacob A. Conover, New York, for a Machine for splitting Wood; to Wm. H. Howard, Philadelphia, for an improvement in Condensers for Fibrous Materials: to Thomas F. Rowland, James Stevens, and Wm. H. Mason, Brooklyn, for an improved Apparatus for drying Grain; to Linus Yale, Newport N.Y., for an improvement in Bank Locks; to Jonas B. Aiken, Assignee to himself and Herrick Aiken, Franklin, N.H., for an improvement in Knitting Machines; to J. B. Terry, Hartford, Conn., for an improvement in Pin-sticking Machines; Milton D. Whipple, Charlestown Mass., for an improvement in preparing Wood for Paper Pulp; to Harrison Loring, Boston, for an improvement in Apparatus for bleaching Rags; to Ethan Allen, Worcester, Mass., for an improvement in Fire-arms; to Samuel T. Thomas, Lawrence, Mass., for an improvement in Looms; to Andrew Campbell, Newark, N.J., for a Machine for feeding Paper to Printing Presses; Henry Colgate, Jersey City, for an improvement in Starch making; John and Thomas Hope, Providence R.I., for a Machine for engraving Printer-rollers; Philip W. Mackensie Jersey City, N.J., for an improvement in Valves for regulating Steam Engines; Wm. V. Gee, New Haven, Conn., for improvements in Looms for weaving Suspender Webbing; Peter Arneson, Jergen Pederson, and Hans Rees, New York, for an improvement in preparing materials for Hat Bodies; to J. C. Stoddard, Worcester, Mass., for producing Music by Steam or Compressed Air; to Israel Amies, Philadelphia, for the employment of Embossed Veneers in the Construction of Furniture, etc.; to Spencer B. Driggs, Detroit, Mich., for an improvement in Piano-fortes; to Samuel Rockafellow, Coatesville, Penn., for an improvement in Reaping and Mowing Machines; Thomas Silver, Philadelphia, for an improved Governor: Thaddeus Selleck, Winchester, Conn., for a Process of reducing Franklinite Ore to obtain Iron and the White Oxide of Zinc; to N. Ames, Saugus, Mass., Assignor to S. Green, of Lynn, for a Morocco-polishing Machine; to John H. Doolittle, Assignor to the American Hosiery Co., Waterbury, Conn., for Knitting Machines; De Grass & Fowler, Wallingford, Conn., for Press for punching Metal; to Andrew Hotchkiss, of Sharon, Conn., for Projectiles for Rifled Cannon, of which nearly one hundred thousand have been used.

1856

In 1856, the following important inventions were patented: of Charles Hammond, Philadelphia, improvements in Hammers; of Horace Smith & Daniel P. Wesson, New Haven, for improved Primers for Cartridges of Fire-arms; of Elisha Harris, Providence, R.I., an improvement in Machines for making Ropes; of Samuel Macferran, Philadelphia, an improvement in Hot-air Furnaces; of G. H. Corliss and Elisha Harris, Providence, for improvements in Rolling Metal and Forging Thimbles; of George W. Livermore, for an improved Stave Machine; of Charles T. James, Providence, R.I., for an improvement in Projectiles; an improved Machine for separating Gold, etc., from foreign substances, by Edward N. Kent, New York City; of J. H. B. Latrobe, Baltimore, Md., for an improvement in Percussion Locks for Fire-arms; of W. W. Albro, for an improved Apparatus for cooking with Quicklime; of Peletiah M. Hutton, Troy, N.Y., for an improved mode of constructing Cast-iron Pavements; of Frederick Newberry, Albany, N.Y., for an improvement in Revolving Fire-arms; of A. B. Taylor, Newark, N.J., for an improvement in Machinery for making Hat Bodies; of Adolph & Felix Brown, New York City, for a Machine for cutting Loaf Sugar; of General Ambrose E. Burnside, Bristol, R.I., for an improvement in Breech-loading Fire-arms; of Edwin Young, Philadelphia, for making a Slate-frame of a single piece of wood; of Wm. W. Cotton, New York, for an improved Machine for making Envelopes; of Eben N. Horsford, Cambridge, Mass., for an improvement in preparing Phosphoric Acid as a substitute for other Solid Acids; of Thomas Petherick, Pottsville, Pa., for an improvement in Coal Breakers; of H. H. Sibley, U.S.A., for an improved Conical Tent; Alfred Spear, Passaic, N.J., for an improved Weather-strip and Lock for Windows; Wm. Selpho, for an improvement in the Construction of Artificial Legs; Francis C. Treadwell, Jr., New York City, for an improvement in Machines for preparing Dough for moulding Crackers; Wm. B. Coates, Philadelphia, for a Machine for cutting Green Corn from the Cobs; David E. Hughes, Louisville, Ky., for an improvement in Telegraphs; Josiah Ashenfelder, Philadelphia, for an improvement in Marble-sawing Machines; Wm. Baxter, Newark, N.J., for an improved Hydro Steam Engine; John J. Howe and Imman Piper, Derby, Conn., for an improvement in japanning Pins; Robert Cornelius, Philadelphia, for an improvement in Safety Valves; James Emerson, Worcester, Mass., for an improvement in Ship's Capstans and Windlasses; Oscar F. Morrill, Boston, Mass., for an improvement in Smoothing Irons; of Wm. J. Horstmann, Philadelphia, for an improvement in Looms; Lysander A. Orcutt, Albany, N.Y., for an improved Dove-tailing Machine; Augustus D. Waymoth, Fitchburgh, Mass., for an improved Machine for making Spools; Thomas B. Atterbury and William Warwick, Pittsburg, Penn., for an improved Face-plate for Locks; John L. Brabyn, New York, for an improved Furniture Polish, known as the "Brother Jonathan;" Gail Borden, Jr., Brooklyn, N.Y., for a Concentrated Milk; Wm. Goddard, New York City, for an improvement in manufacturing Seamless Hosiery; Cummings Cherry, Pittsburg, for an improved Apparatus for purifying and distilling Oil from Mineral Coal; Andrew Hartupee, J. Morrow, and J. P. Haigh, Pittsburg, for an improvement in Adjustable Cut-offs for Steam Engines; to Robert A.

Smith, Brooklyn, N.Y., for an improved Machine for sweeping Streets; Joseph Goodridge, Assignor to the Boston Faucet Company, for an improved Faucet; Edwin, Artemas, and Cheney Kilburn, Burlington, Vt., for an improved method of bending Wood; W. B. Wood, Fitchburgh, Mass., for an improved Hoop Machine; James S. Taylor, Danbury, Conn., for an improvement in Machinery for forming Hat Bodies; John P. Cowing, Seneca Falls, N.Y., for an improvement in Pumps; Thomas Blanchard, Boston, Mass., for an improved Method of bending Wood; Moses S. Beach, Brooklyn, N.Y., for an improvement in feeding Paper to Printing Presses; Theodore T. Woodruff, Alton, Ill., for an improvement in Railroad Seats and Cars; John S. Sanson and Wm. P. Farrand, Philadelphia, for an improved Machine for making Metallic Slats for Blinds: Wm. H. McNary, Brooklyn, N,Y., for an improvement in the manufacture of Hosiery; of Blakesley, Platt & Jordan, Waterbury, Conn., for Machinery for making Brass Kettles; N. Ames, Saugus, Mass., Assignor to the "Boston Hand-stamp Co.", for a Self-marking Hand-stamp.

1857

In 1857 a patent was issued to Evan Morris, Philadelphia, for an improvement in Hats: to Thaddeus Fairbanks, St. Johnsbury, Vt., for an improvement in Platform Scales; to Milton Finkle, New York City, for an improvement in Sewing Machines; to George and David Cook, New Haven, Conn., for improved Adjustable Seats for Carriages; to Henry Wiessenborn, New York City, for an improvement in Blast Furnaces; Anson & A. Spencer, Wolcott, East Bloomfield, N.Y., for a device for ageing Liquors by Swinging Shelves, gently heated; to Wm. J. Horstmann, Philadelphia, for an improvement in Machines for cutting Fringes; to Wm. & Coleman Sellers, Philadelphia, for an improvement in Coupling for Shafting; Wm. F. Channing, Boston, for an Electro-magnetic Fire-alarm Telegraph for Cities; Wm. H. Howard, Philadelphia, for an improvement in Looms; Wm. W. Marston, New York, for an improved Repeating Fire-arm; Benjamin F. Sturtevant, Assignor to self and Elmer Townsend, Boston, for an improved Machine for pegging Boots and Shoes; to A. A. Hayes, Boston, for an improved Gas Retort or Generator; Mills B. Espy, Philadelphia, for an improved device for sealing Bottles, Cans, etc.; James C. Ayer, Lowell, Mass., for an improvement in Pill Machines; Alfred Monnier, Camden, N.J., for an improvement in the Manufacture of Sulphuric Acid; Wm. Selpho, New York, for an improvement in the Construction of Artificial Hands; Timothy Alden, New York, for an improved Type-Setting and Distributing Machine; Wm. W. Batchelder, New York City, for an improvement in Gas Burners; Cyrus Chambers, Jr., Philadelphia, for an improvement in Machines for folding Paper; Wm. H. Ward, Auburn, N.Y., for an improved Bullet Machine; John McCollum, city of New York, for an improvement in Machines for rolling Dough; Wm. Sellers, Philadelphia, for an improved Machine for threading Bolts; John D. Dale, Philadelphia, for an improved Planing Machine; Isaac Linsley, Providence, for an improved Machine for carving Wood; Charles Hicks, Assignor to American Flask and Cap Co., Waterbury, Conn., for an improvement in Machine for varnishing Percussion Caps; H. L. McNish, Assignor to himself and D. C. Butler, Lowell, Mass., for a Stave Dresser and Jointer; to George Wellman, Lowell, Mass., for a Machine for cleaning Tap Cards of a Carding Engine.

1858

The number of patents issued in 1858 was 3710, of which 562 were for inventions relating to Agricultural Implements and Processes, including 152 for improvements in Reaping and Mowing Machines; 42 were for improvements in Cotton Gins and Presses and in packing Cotton; 164 for improvements in the Steam Engine; 198 for improvements in Railroads and Railroad Cars; and 116 for improvements in the Sewing Machine. Among the valuable inventions patented during the year were Phelan & Collender's improved Cushions for Billiard Tables. Tisdale Carpenter, Providence, R.I., patented a Machine for making Horse-shoe Nails; Lewis Lillie, Troy, N.Y., an improved Iron Safe; P. P. Uhlinger, Philadelphia, a Sewing Machine; Campbell Morfit, Baltimore, a process of making Soap; Samuel T. Stratton, Philadelphia, an improved manufacture of Starch; Ira L. Cady, Assignor to Cornell & Co., New York, Plates for Burglar-proof Safes; Eli Wheeler and Charles H. Harrington, Sleeping-car for Railroads; John H. Cheever, N.Y., a Belting Machine; Joel Woodward, Philadelphia, an improved Mill and Machinery for bolting and dusting Flour; Wm. B. Bement, Philadelphia, Hangers for Shafts; H. Disston, Philadelphia, Leveling Device attached to Handsaw; Samuel Gardiner, New York, the Electrical Gas-burner Lighter; D. M. Cook, Mansfield, Ohio, a portable Evaporator for making Refined Sugar direct from the ripe China Cane; Henry R. Rowland, Boston, Mass., an Apparatus for Walking on the Water; S. T. Stratton, Philadelphia, an improvement in the manufacture of Starch; John McNary, Brooklyn, N.Y., an ingenious Automatic Lathe; F. O. Degener, New York, an improved Printing Press; J. E. A. Gibbs, an improvement in Sewing Machines, known as the Willcox & Gibbs Sewing Machine; J. P. Evans, Hazelton, Luzerne Co., Penn., an improved Coal-washing Machine; C. G. Atwood, Assignor to the Shelton & Osborne Skirt Manufacturing Co., Birmingham, Conn., an improved Skeleton

Skirt; Edward Conroy, Boston, an improved Cork-cutting Machine; Edward & Calvin E. Town, New York, an improved Paging Machine; Isaac T. Reed, Boston, Reed's Cancelling Stamp; Samuel L. Denney, Christiana, Penn., an Adjustable Three-rollered, Horizontal Sorghum Mill. The smallest size is capable of expressing 75 gallons of juice per hour. Mr. Denney is also the inventor of an improved Monitor, or Double-turret Steam Battery, described in *Scientific American*, August 9, 1862.

1859

In 1859 a patent was granted to F. C. Wesson, Worcester, Mass., for a Breech-loading Rifle, now made by the Smith & Wesson Fire-arms Co.; Nathan Olney and Charles H. Kellogg, Amherst, Mass., for a Machine for cutting Spokes; F. Hoffman, New York City, for a Bedstead that could be folded up and appear like a Bureau; Samuel Colt, Hartford, Conn., for a Gunstock that was also a Canteen, and Coupling Gunstocks with Pistols; to Wright Duryea, Glen Cove, L.I., for an Apparatus to manufacture Starch; James B. Duff and Thomas W. Keating, New York City, for an Envelope Machine; John McCollum, New York City, for an ingenious Cracker Machine; John Griffin, Louisville, Ky., for an Apparatus for picking Cotton by Steam; Bartlett & Lesley, New York City, for an improved Refrigerator; to B. S. Herring, Portsmouth, Va., for an attachment to the heel of a shoe or boot, by which one can tell the number of miles he has walked; Peleg Barker, North Adams, Mich., for a Machine for measuring and bagging Grain; E. B. Gleason, Boston, Mass., for a combined Letter and Envelope; G. W. Pittman, Assignor to Charles L. Frost, New York City, for a Machine for spinning Rope; Cyrus Chambers, Jr., Philadelphia, for an improved Paper-folding Machine; L. S. White, Waterbury, Conn., for a burnishing Machine; J. W. Gardner, Assignor Lamson Goodnow & Co., Shelburne Falls, Mass., for an improved handle for Cutlery; Stephen P. Ruggles, Boston, Mass., for a Punching and Stamping Press; Benjamin T. Harris, Brooklyn, N.Y., for a Mechanism by which Employees can register their Time; Jonas Bradley Aiken, Manchester, N.H., for a Knitting Machine; James Albro, Elizabeth, N.J., for a process of making Oilcloth resemble Damask; Wm. Field, Providence, R.I., for an improved Horse-power Machine; Archibald Ford, Newport, Ky., for a Machine for opening Old Rope; Charles McBurney, Boston, Mass., for the manufacture of India Rubber Blankets or Aprons used in the printing of Fabrics, Books, etc.; J. Hall Rohrman, Philadelphia, a Dust-pan, a new article of manufacture; Wm. D. Tewksbury, Cuylersville, N.Y., for a Self-rocking Cradle;

Wm. Resor, Cincinnati, Ohio, for an improvement in Cooking Ranges; J. C. Stoddard, Worcester, Mass., for a combined Haymaker and Hay-raker; George P. Gordon, New York City, for a Printing Press; Lewis Lillie, Troy, N.Y., for an improvement in Vault Doors, and Cast Iron Safes; Philander Perry, Troy, N.Y., for an improved Grinding Mill, Corn-sheller, and Straw-cutter combined; J. A. Reed, Jersey City, N.J., for improvements in Oscillating Engines; J. W. Masury, Brooklyn, N.Y., for an improved Paint Can; Charles Peck, Assignor to Milo Peck & Co., New Haven, Conn., for an improved Tool Holder; Robert Poole, Assignor to Poole & Hunt, Baltimore, Md., for an improvement in casting Chilled Plates; Moses S. Beach, New York, for an improvement in Machinery to feed Sheets of Paper to Printing Presses; to Marcus P. Norton, Troy, N.Y., for an improvement in Post-marking Stamps; William Goodale, Clinton, Mass., for a Machine for making Paper Bags; Horace H. Day, New York, for an improvement in the manufacture of Ribbed Elastic Cloths; Obed Hussey, Baltimore, Md., for an improvement in Harvesters; Thomas Armitage, for an improved Feed-water Apparatus for Steam Boilers; Tisdale Carpenter, Providence, R.I., for an improvement for operating the Valves of Steam Engines; John Sparrow, Portland, Maine, for a Steam Riveting Machine; L. S. Ballou, Jr., New York City, for an improvement in the yoke of Shirts securing a good fit; John A. Evarts, West Meriden, Conn., for an improvement in the mode of manufacturing Pulleys; J. W. Cochran, New York City, for an improvement in Projectiles for Ordnance; Wallace & Son, Ansonia, Conn., for improved Clasps for Skirt Hoops; Joseph W. Fawkes, Christiana, Penn., for an improvement in Steam Plows; R. D. Nesmith, Franklin, N.H., for an improved Machine for picking Mill Stones; Henry Steinway, Jr., New York City, for an improvement in Piano-fortes; H. D. Stover, New York, Stover's Molding Machine; F. J. Mayall, Roxbury, Assignor to J. H. Cheever, New York, for improved composition for the manufacture of Emery Sticks and Wheels; James J. Mapes, Newark, N.J., for an improvement in Fertilizers by combining dried blood with Superphosphate of Lime; Wm. L. Williams, New York City, an improved Machine for splitting Wood; Thaddeus Selleck, Winchester, Conn., for coating the Surfaces of Iron with Franklinite metal; John Stephenson, New York City, for an improvement in Brakes for Horse-cars; Wm. Thomson, Buffalo, N.Y., for a Brush by which the nails of the thumb and each finger on one hand may be cleaned at the same operation; James Draper, Hudson City, N.J., Assignor to himself and S. H. Doughty, of New York City, for a new manufacture of Skeleton Skirt.

1860

In 1860, Perry Davis, of Providence, R.I., received a patent for an improvement in the construction of Boats[1]; Barton H. Jenks, Philadelphia, for an improvement in Cotton Gins; Septimus Norris, Philadelphia, for an improvement in Steam Boilers; D. De Forest, Springfield, Mass., for an improvement in Artificial Legs; Robert L. Reaney, Philadelphia, for an improvement in Gold Separators; John Souther, Boston, for improvement in Apparatus for evaporating Saccharine Juices; David Thain and Wm. Jackson, Philadelphia, for obtaining Fatty Matters or Stearic Acid from Residues; M. P. Wilmarth, Pawtucket, R.I., for an improvement in Ring Spinning Frames; Francis D. Ballou, Assignor to himself and J. L. Nash, of Abington, Mass., for an improvement in the manufacture of Boots and Shoes; Seth Boyden, Newark, N.J., for an improvement in Machinery for forming Hat Bodies; Wm. S. Mackintosh and James Hemphill, Pittsburg, Pa., for improvements in Oscillating Engines; Theodore T. Woodruff, Philadelphia, for an arrangement of Seats in Railroad Cars, forming also Couches; J. S. Sanson, Philadelphia, for a Self-acting Switch for City Railroads; Robert W. Jenks, Jr., Providence, R.I., for an improvement in Railroad Gates; George S. Adler, Philadelphia, for his Machine for polishing Leather; Henry B. Fay, for an improved Paddle Wheel; R. Hecksher, New York City, for an improvement in Coal Carts; J. P. Manton & H. A. Billings, Providence, for an improvement in hanging Rudders;[2] H. K.

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(1) This invention and improvement in Buggy Boats consists in combining an India-rubber spring in a novel manner with suitable gear-wheels for operating the carriage wheels, which become propellers when the boat is in the water. The gearing was so arranged as to be disengaged when the boat is on land, and the wheels are used as carriage wheels. It further consisted in attaching the bow of the boat to the axletree of the front wheel by a universal joint, which is constructed so as to admit of the introduction of an India-rubber spring for giving elasticity to the bow of the boat and preventing it being in any way injured in driving it over rough roads.

(2) The object of this invention is to hang the rudder in such a manner that it will work with but little friction and still be properly supported and firmly secured to the vessel. Edgar Paine, commander of ship "C. C. Lord, of Boston," writes to the inventor:

"I cheerfully state that the working of your windlass is every way satisfactory, both in letting go and taking up anchor. We had a chance of trying it very thoroughly in the outer anchorage of St. John's harbor, and it showed beautifully the great advantages it possesses of speed, power and ability to get an anchor under the most unfavorable circumstances; and all, with astonishment at the immense power, spoke as of one mind in expression of the pleasure and advantage of having so powerful and perfect a working windlass. It seems to be but the work of an instant to let go anchor, and we can control the running out as we please with the nipper bars and friction band. I would not part with mine for double its cost if I could not get one replaced of the same."

Symmes, Newton, Mass., for an improved mode of extinguishing Gas-lights; Grice & Long, Philadelphia, for an improvement in Running Gear for City Railroad Cars; W. D. Grimshaw, Newark, N.J., for a means of determining the Temperature of a Cargo in the Hold of Vessels and detecting Fires; George K. Snow, Watertown, Mass., for an improved Machine for folding and pasting Paper; F. S. Pease, Buffalo, for an improvement in Hydro-carbon Vapor Apparatus; Wm. Sellers, Philadelphia, for an improvement in Turning Lathes; Robert A. Smith, New York City, for a Street-sweeping Machine; John B. Cornell, New York City, for an improvement in the construction of Fireproof Safes; Wm. Tallman, Providence, R.I., for an improvement in Horse-shoe Nail Machines; J. C. Cooke, Middletown, Conn., for an improvement in welding Large Planks of Wrought Iron; A. Hoen, Baltimore, Md., for his Composition for etching Stone; R. T. Wilde, New York City, for his improvement in the manufacture of Bonnet Frames; James A. Gray, Albany, N.Y., for his improvement in Piano-fortes; W. T. Nicholson, Providence, R.I., for an improvement in Spirit Levels; D. A. Woodbury, Rochester, N.Y., for an improvement in Air-pumps for Steam Engines; W. J. McClelland, Assignor to Ernest Greenfield, New York City, for an improvement in Machines for cutting Lozenges; J. B. Cornell & Wm. W. Cornell, New York City, for their improvement in Metallic Rolling Shutters; W. H. McNary, Assignor to the McNary Knitting Company, for an improvement in Knitting Machines; Philander Shaw, Boston, Mass., for an improvement in the Method of preparing and molding Wood into Different Forms; Fred. Otto Degener, New York City, for an improvement in Printing Presses; W. C. Bement, Philadelphia, for an improved Machine for cutting Key Seats; L. O. Colvin, Cincinnatus, N.Y., for his improved Cow Milker; Ethan Allen, Worcester, Mass., for an improvement in Revolving Fire-arms; J. W. Taber, New Bedford, Mass., for an improvement in Lamps; H. L. McNish, Assignor to himself and D. C. Butler, Lowell, Mass., for a Barrel-head Turner; D. B. Hotchkiss, Sharon, Conn., for an improvement in Projectiles for Rifled Ordnance; H. L. Emery, Albany, N.Y., for an improvement in Cotton Gins; H. D. Stover, New York, for an improved Planing Machine; Milo and Charles Peck, New Haven, Conn., for an improvement in Drop Presses; Alexander Morton, New York City, for an improved Trip Hammer; J. W. Cochran, New York, for an improvement in Projectiles; George P. Reed, Roxbury, Mass., for an improvement in the Balance Spring of Watches; Alfred G. Holcomb, New York, for his improvement in Electro Magnets; James Davis, Schuylkill Haven, Pa., for an improvement in Canal

Locks;[1] W. N. Gee, New Haven, Conn., for a Machine for turning Bags; W. C. McClelland, Chicopee, Mass., for Wooden-soled Boots and Shoes; Cyrus Chambers, Jr., Philadelphia, for improvements in Paper-folding Machines; Eli Tiffany, Assignor to himself and George Cooper, Thompsonville, Conn., for an improved Machine for knitting Shirts, Cuffs, etc., and making plain or ribbed work; Dennis Aldrich, St. Louis, Mo., for a chemical process of converting Dry Flint Hides into a perfectly green condition, without any mechanical labor, and for improvements in the construction and combination of Tanning Apparatus;[2] J. C. Rainbow, New Brighton, Beaver Co., Pa., for a valuable Relief from Truss and Cure for Hernia or Rupture; Sidney Hudson, Milford, Oakland Co., Mich., for Self-acting Gates to prevent the breaking away of Mill-dams by an overflow of water; E. F. Reynolds, New York City, a Recording Telegraph; Wm. H. Clark, Cincinnati, Ohio, for improvements in Cane Mills; Linus H. French, Philadelphia, improved Car-Register, by which each Passenger entering a car will be registered by an index hand.

1861

The inventions of 1861 are largely of articles used in camps and by the Army,—improvements in Breech and Muzzle loading Guns, modes of mounting and operating Heavy Ordnance; in improvements in Guns, Pistols, and Locks; improvements in Projectiles and Shot; in Bits for cavalry horses; in Stirrups, Drinking Cups and Tubes; Epaulets, and modes of fastening them; Portable Tents and Military Caps. In addition to these, the list of inventions includes that of J. J. Doyle, New York City, for an improvement in Hoisting Devices; of Edmund Munson, Utica, N.Y., for a Machine for facing and polishing Millstones;

(1) This invention consists in combining with a Lock Chamber a Water Way or Passage, or Water Weys or Passages, extending from the Lock Chamber to the level above and below the Lock, for the purpose of preventing the water from "piling" at the bow of the boat or vessel on entering the Lock, and to prevent the "suck," which retards the boat or vessel when she leaves the Lock, said passages being provided with suitable wickets to close and open them as circumstances may require. Mr. Davis's improvement in Locks is considered by the best practical engineers in this country, to be superior to any thing of the kind now in use in the United States; for the simple reason that it saves water and facilitates the speed of the boat both in and out of the Lock. The operation is the same coming up the canal as going down.

(2) This improvement of Mr. Aldrich is a thorough systematising of the whole process of Tanning, bringing the renewal, strengthening, and changing of liquors, and the agitation and changing of the position of the hides in the vats perfectly under the control of the operator, enabling him at any time to determine in a few minutes the precise condition of the stock, and the time and amount of material used or required to complete the process. All the vats are made six feet deep, with adjustable lids that can be made air-tight; which, by avoiding the acidification common to open vats, saves 40 per cent. of the tanning material used.

S. Jaqua, Paterson, N.J., for a Machine for rolling Railway Tire; P. F. Smith, New York City, a Paper Necktie, a new article of manufacture; Ross Winans and Thomas Winans, Baltimore, Md., for an improved Anchor Well and Anchor; Prosper Humbert, Boston, for an improved Watch Escapement; Goodrich Holland, Willimantic, Conn., for sizing Silks; James Spear, Philadelphia, for an improvement in Cooking Stoves and Ranges; Cyrus Chambers, Jr., Philadelphia, for an improvement in folding, pasting and cutting Paper; Richard Solis, New Brunswick, N.J., for a Machine for manufacturing Elastic shirred Goods; Francis B. Blanchard, Brooklyn, N.Y., for an improved Steam Boiler; Frank Colligan, Buffalo, N.Y., for an improvement in Steam Boilers; George C. Howard, Philadelphia, for an improvement in Machines for perforating Paper; J. W. Hardie, New York City, for improved construction of Knife and Fork; F. B. Stevens, Weehawken, N.J., for sundry improvements in Steam Engines; J. L. Lairdieson, Troy, N.Y., for an Apparatus for varnishing Loom Heddles; J. A. DeBrame, Assignor to himself and Jeremiah Gurney, of New York City, for improvement in Revolving and Breech-loading Ordnance; George Cooper, Thompsonville, Conn., for an improved Needle;[1] J. R. Gates, Louisville, Ky., his Wine and Cider Mill;[2] O. J. Hall, Brighton, Monroe Co., N.J., for an improved Railroad Chair;[3] Levi A. Beardsley, South Edmeston, N.Y., for a Hay Elevator;[4] Wm. G. Reed, Chelsea, Mass., for a Roof completely fire and water proof.

(1) The nature of Mr. Cooper's improvement in sewing needles consists in constructing the eye by turning over the end and forming what is called a lap joint, through which the thread may be drawn without the necessity of inserting the end of it in the ordinary way. The advantages derived from this improvement are various, among which are that the blind can use them as readily as those who can see; that worsted needles, generally so tedious to thread, are readily put through that operation; and also, that surgeons will find these needles convenient, as they will readily pass through the flesh, obviating any delay formerly incurred by threading.

(2) This Mill invented by Mr. Gates has become exceedingly popular in the West. The manufacturers claim for it the following advantages over all others as yet offered to the public:—1. A greater amount of efficiency, with less weight and expense. 2. It will crush and press more apples in a given time with less power. 3. It is less liable to get out of order. 4. It is arranged to run by hand or power. 5. It is more convenient; by two thumb screws the hopper is turned upside down, and every part exposed to view for cleaning. 6. It is better adapted to other purposes than any other. 7. It will make eight barrels of cider per day.

(3) Mr. Hall's improvement in Railroad Chairs is in use on the New York Central Railroad, and gives good satisfaction. It is in two sections or halves, is suspended between the ties, requires no spike, and prevents the bruising of the ends of the rail.

(4) This Hay Elevator received an honorable mention at the World's Fair in 1862. Mr. Beardsley is a very ingenious inventor, and his list of inventions includes an improved Earth Elevator, a Wire Hop Yard, etc.

1862

In 1862, J. J. Althouse of New York City, patented his improvement in Plastering Surfaces; G. P. Gordon, New York City, patented thirteen improvements in Printing Presses; James McNamee, Easton, Pa., his combined Bread and Pastry Board and Flour Chest; W. F. Cochran, Springfield, Ohio, his improvement in Grain Threshers and Separators; J. F. Winslow, Troy, N.Y., his improved Machine for compressing Puddle Balls; Marcus P. Norton, Troy, N.Y., his Hand Stamp for Post-offices; Allen Walton, Philadelphia, his method of manufacturing Illuminating Gas from Coal Oil; S. S. White, Philadelphia, patented his Artificial Teeth, with pins having heads; William Sellers, Philadelphia, his improvement in the mode of Transmitting and arresting Motion; J. F. Sargent, Assignor to Elmer Townsend of Boston, his improvement in Machinery for rolling Metal for Shoe Tacks and Pegging Boots and Shoes; T. A. Jenckes, Providence, R.I., his improved Waterproof Fabric; J. E. Walcott, Boston, Mass., his improvement in process of Electrotyping Iron and other Metals with Copper; N. S. Wallbridge, his improved Steam Engine, now made by C. C. Whittlesey, of Malone, N.Y.; B. T. Babbitt, New York City, his improvement in the manufacture of Cannon, keeping the piece cool when in use; E. M. Judd, New Britain, Conn., his improvement in Repeating Fire-arms; W. H. Bliss, Newport, R.I., his improvement in Hose-coupling, now used by the Fire Department in Brooklyn; J. Vaughan Merrick, Philadelphia, his improved Slide-valves for Steam Engines; L. O. Colvin & G. H. Gardner, Philadelphia, an improvement in telegraphing by light; C. O. Parmenter, Amherst, Mass., his Machine for forming Hats or Bonnets from one or more pieces or sheets of palm-leaf fabric at one operation; J. W. Bartlett, New York, his combined Needle-gauge and Adjuster, for Sewing Machine; Sheridan Roberts, Cleveland, Ohio, his improvement in Barrel-making Machines; M. D. Whipple, Cambridge, Mass., Assignor to Whipple File Manufacturing Co., his improvement in Machines for cutting Files; A. B. Cooley, Philadelphia, his improved Floating Battery; Tisdale Carpenter, Providence, R.I., his improvement in the Steam Engine;(1) Isaac Edge, Jersey

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(1) Mr. Carpenter's improvements upon the Stationary Engine are the most valuable of the present day. As a result they secure perfect regulation directly by the induction valves, great simplicity of construction, the least possible waste of steam passages and clearance of the steam ports, and almost noiseless action. The *Scientific American* enumerates the qualities claimed to be embodied in these improvements as follows: First, an automatic cut-off, regulated by the steam valve, using the steam at its full pressure; variable throughout the entire length of stroke of the engine, and both opening and closing the steam valve with a positive motion, without the use or intervention of weights, springs, or any other contrivances of the kind. Second, the exhaust valves are worked with an intermittent motion, being moved quickly at

City, and C. C. Hyde, of Stonington, Conn., their improved mode of firing Night Signals; R. P. Parrott, Cold Spring, N.Y., the now celebrated Parrott Gun; Watson Sanford, Brooklyn, N.Y., his improvements in Dampers, Hot-air Furnaces and Stove Linings; Simon Heiter, Philadelphia, his improvement in Tents; Robert Chadwick, Hartford, Conn., his improvement in Machine for casting Bullets; W. V. Daboll, Cranston, R.I., his improvement in Street-sweeping Machines; J. S. Atterbury, James Reddick, and T. B. Atterbury, Pittsburg, Pa., their improvement in the manufacture of Hollow Glassware; James Adair, Pittsburg, Pa., his improvement in Condensers for Oil-stills; Horatio Worcester, New York City, his hinged Plates for Piano-fortes, designed to increase the volume and improve the quality of the tone; W. B. Wadman, Boston, his improvement in Coal Sifters; Gelston Sanford and J. E. Mallory, New York City, their improvement in Machinery for breaking and cleaning Hemp and Flax; H. V. Butler, New York City, his improvement in device for changing Speed in Machinery; Thomas Shaw and Philip S. Justice, Philadelphia, an improved mode of securing Armor Plates to Vessels; Henry Burden, Troy, N.Y., his improved Machine for making Horse-shoes; F. B. Stevens, New York City, his

the proper time, and then remaining stationary during the rest of the stroke; this gives a freer exhaust, because the motion of the valve is so rapid that it is not necessary to begin closing the exhaust port in front of the piston so early in the stroke as when the valves are moved by an eccentric. Third, the steam and exhaust valves are both placed in the cylinder heads; this allows the valves to be brought nearer to the interior of the cylinder than any other arrangement, and, of course, reduces the amount of waste space in the steam passages and clearance at the ends of the cylinder to the smallest possible quantity,—the engine being in this respect superior to any other now in use and absolutely beyond improvement. The arrangement also allows the valves or interior of the cylinder to be easily examined, and involves no difficulty whatever in packing the steam-joints; besides, the valves are of the simplest sliding form, without complication in any manner. Fourth, the engine combines with these qualities the most perfect regulation, the governor being almost entirely divested of any labor, and only required to indicate when a change should be made. It is also perfectly free to act in either direction at any time during the entire stroke of revolution of the machine. Fifth, the piston packing, in addition to its cheapness, will, from the peculiar arrangement of the spring, be very elastic when first set in the cylinder, and will remain steam-tight for a much longer time or degree of wear on the outside of the rings than any other method. Sixth, the self-oiling slide is a source of convenience, neatness, and economy, combined with no perceptible added cost to the machine. Finally, the engine, as a whole, is very compact, durable, cheaply constructed, and combines more good qualities, with the addition of some not found elsewhere, with fewer parts than can be obtained in any other machine.

Mr. Carpenter, in addition to inventing a good engine, has been very fortunate in securing the co-operation of Mr. L. P. Child, a gentleman of means in Providence, and who is jointly interested with him in the patents. This engine is manufactured at the Phœnix Foundry, Providence.

improvement in Valves for heating Feed Water for Steam Engines; A. L. Weymouth, Boston, Mass., his improved Bit for taming Horses; A. E. Young, Dorchester, Mass., his improved Glass Table Castors; Hon. Franklin Muzzy, Bangor, Me., his improved Machine for sawing Shingles, Box Boards, etc.; R. A. Stratton, Assignor to G. W. Carr & Co., Philadelphia, his improvements in Joints for Ribs of Umbrellas and Parasols, and in Tips; Alexander Douglass, of Douglass & Sherwood, New York, his improved Store Truck; James G. Wilson, New York City, his improved Circular Machine for knitting Stockings without Seams; George H. Corliss, Providence, R.I., for sundry improvements in Steam Boilers, Surface Condensers, and Steam Generators; John H. Post, Paterson, N.J., his combined Sawing, Boring, Molding, and Planing Machine; Francis Alger, Boston, Mass., his improvement in Fuses for Explosive Shells; Nathan Chapin, East Saginaw, Mich., his improvement in manufacturing Salt; C. C. Whittlesey, Malone, N.Y., his improved Universal Wood-cutting Machine; Henry A. Burr and L. E. Rockwell, New York City, his improvement in Lubricators; John C. Gore, Jr., Jamaica Plain, Mass., his Patent Belt Shifter;[1] Benjamin Roberts, Clintondale, Ulster Co., N.Y., his portable Baling Press;[2] C. B. Cotter, Milford, Pa., a mold for casting all kinds of metals frequently without reconstruction, respecting which the Commissioner of Patents has said, "Its value can only be estimated by millions of dollars;" Benjamin Arnold, East Greenwich, R.I., his Machine for Nets and Netting.[3]

(1) This invention of Mr. Gore's obtained the Prize Medal at the late London International Exhibition in 1862. It secures perfect and quick action of the belt, and in saving of Banding by its use it is said that it will more than reimburse its original cost in a few months' besides preventing accidents and danger to life which so frequently happen *from the accidental shifting of machinery belts. By this invention the band is held securely upon the fast or loose pulley as desired*, and is changed from one to the other by means of the ordinary lever or cord,—the guide being unlocked, shifted, and locked by one motion of the hand.

(2) Mr. Roberts' press for baling hay or cotton, is highly recommended by those who have used it. Its size is such that it can be used in a much smaller space than any other press, and can be kept under cover in a space but little larger than that required for a Fanning Mill, without taking off the levers, and is consequently ready for use at all times. It has also advantages in cheapness, in comparison with any other press of equal power.

(3) The father of this inventor, Mr. A. Arnold, now residing in Washington, is the inventor of the "compound motion," one of the most important improvements in cotton machinery ever made. Dr. Ure, in his Philosophy of Manufactures, credits this invention to Henry Houldsworth, an Englishman; but his patent bears date in 1826, while Mr. Arnold's was granted in January, 1823. It is said this invention is in use in almost all the Cotton Mills in this country and in England.

INDUSTRIAL EXHIBITIONS.

Among the plans which were adopted early in the present decade to stimulate progress in the Arts and Manufactures, the most useful and noteworthy was the attempt to exhibit in one building the works of Industry of All Nations. In 1850, his Royal Highness, Prince Albert, as President of the Society of Arts, proposed an exhibition of this kind in order to give "a true test and living picture of the point of development at which the whole of mankind had arrived in this great task;" and he has the credit of having originated the first and most successful of all these exhibitions,—that held in London in 1851. The building was in itself a miracle of art and beauty. It was constructed chiefly of glass and iron, after a plan submitted by Sir Joseph Paxton, and covered an area of about 18 acres. Its general form was a parallelogram, 1848 feet long and 478 feet wide, the greatest length running from east to west. There was also a projection on the south side, 936 feet long and 48 feet wide. This area was subdivided into twelve avenues of various widths, the chief, or central, passage being 72 feet wide and 63 feet high. The avenues were formed by rows of hollow cast iron columns, 8 inches in diameter, placed in line 24 feet from each other, and which acted as supports for the building and rain-water drains. There were 294,000 panes of glass used in the building, the bulk being 49 inches long by 10 inches broad, and the total cost of the structure was £142,000 7*s.* 6*d.* The Exhibition remained open 141 days, the number of persons who visited it is stated at one million, thirty-nine thousand one hundred and sixty-five, and the gross receipts at £423,792 4*s.* 6*d.* The resources of the United States in raw materials and articles of food were tolerably represented, but no accurate idea of the progress in the arts, and development of manufactures could be obtained from the few specimens which found their way to that Exhibition. Our countrymen, however, achieved decided triumphs in several departments; McCormick's Reapers; Bigelow's Carpet Power Looms; Day & Newell's Locks, St. John's Variation Compass and Velocimeter, and Dick's Anti-Friction Press had no rivals, and afforded conclusive demonstration of American superiority in utilitarian inventions.[1]

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(1) Those of our manufacturers who were enterprising enough to furnish contributions to an Exhibition so novel and distant, deserve the honors of history, and their names should be held in grateful remembrance. The following is a list of

The brilliant success that attended the London Exhibition suggested to citizens of New York the idea of having one on American soil; and, on the 11th of March, 1852, the Legislature of the State of New York enacted a charter of incorporation for "The Association for the Ex-

EXHIBITORS OF AMERICAN MANUFACTURES AT THE LONDON EXHIBITION IN 1851.

New York.

Allen, A. B., & Co., Agricultural Implements.
Arrowsmith, George A., Jenning's Permutation Locks.
Brooklyn Flint Glass Co., Flint Glass.
Brady, M. B., Daguerreotypes.
Chevalier, John D., Dental Instruments.
Commeford & Redgate, Chairs.
Cochran, John W., Brick Machine.
Starr, Charles, Books, and Bookbinding Machines.
Pirsson, James, Piano-fortes.
Meade Brothers, Daguerreotypes.
Hecker & Brother, Farina, Samp, Hominy, Flour.
Jeffers, Wm. H., Boots and Slippers.
Simmons & Co., Axes and Edge Tools.
J. & J. L. Seabury, Stove Polish.
Putnam, G. P., Books and Binding.
Walker, Edward & Co., Printing and Binding.
Herring, Silas C., a Salamander Safe.
Leary & Co., Hats.
Frisbie, M. J., India-rubber Shoes.
Gwynne, James Stuart, Pumps.
Bullock, S. W. & J., Self-operating Oil-Press.
Erricsson, John, Nautical Instruments.
Disturnell, J., Maps.
Brown, Solyman, Articles for Dentistry.
Hiler, Selah, Stair Rods, etc.
Armstrong, S. T., India-rubber Air Pontoons.
Lyon, E., Insect-destroying Powder.
Brooks, Wm. T., Jackson's Annunciator.
Harrison, C. C., Daguerreotypes.
Pooley, S. J., Miniature Dinner Sets, etc.
Genin, J. N., Hats and Caps.
Blake, Wm., Fireproof Paint.
Smead, Charles, House's Telegraph.
Day & Newell, Locks.
Colgate & Co., Starch.
Macy, Josiah & Sons, Spermaceti and Candles.
Gray, Dr. J., Artificial Human Eyes.
Pecare & Smith, Pistols.
Day, Horace H., India-rubber Manufactures.
Colton, J. W., Maps.
Harrington, J. W., Stained Glass.
Lee, Wellington, Spathic Iron Ore.
Sibell & Mott, Account Books.
Haskell, Merrick & Bull, Drugs.
Sperry, Henry, Clocks.
Palmer, W. R., Rifles.
Wadsworth & Sheldon, Mess Beef.
Monahan & Beers, Tobacco.
Barlow, E., Articles for Dentistry.
Fox & Polhemus, Cotton Duck.
Baron Brothers, Fire Ladder.
Hill, John, Trunks.
Lord, Lynch & Co., Soap.
Macy, Stanton & Co., Cassimeres.
Nunns & Clark, Pianos.
Church & Chittenden, India-rubber Shoes.
Phalon, Edward, Hair-work, Wigs, etc.
Tobit, John H., Combination Type.
Wood & Tomlinson, Sporting Wagon.
Leroy & Co., Tin Pipes.
Prosser, Thomas & Son, Horse Powers Tinman's Machines, etc.
Gibson, Wm., Stained Glass.
Fitch, Dr. Samuel S., Plated Abdominal Supporters.

Philadelphia.

Abbey, Charles, & Son, Dentists' Gold Foil.
Hauel, Jules, Perfumery and Fancy Soaps.
Bazin, Xavier, do. do.
Palmer, B. Franklin, Artificial Legs.
Lacey & Phillips, a variety of Harness.
Root, M. A., Daguerreotypes.
Wetherill Brothers, Chemicals.
Morris & Jones & Co., Specimens of Hanging Boiler, Plate-iron of first quality, and of Hammered Bar Iron.
Oakford, Charles, Hats.
Cornelius & Baker, Chandeliers.

HIBITION OF THE INDUSTRY OF ALL NATIONS." The capital was nominally two hundred thousand dollars, with permission to increase it to three hundred thousand. The stock was not sought for in large sums, and was distributed among more than one hundred and fifty individuals

Howell & Brothers, Paper Hangings.
Husband, T. J., Calcined Magnesia.
Mattson, T. W., Trunks.
Crawford, H. M., various Calf Skins.
Duval, P. S., Chromo-lithographs.
Watson, George W., Gazelle Wagon.
Savery, P. B., Enamelled Hollowware.
Lippincott, Grambo & Co., various Books and Specimens of Bookbinding.
Hickey & Tull, Trunks.
Meyer, Conrad, Piano-fortes.
Simes, Samuel, Cod Liver Oil.
Senneff, Jacob, Weaver's Heddle.
Clinton, Edwin, Hair and Cloth Brushes.
Taylor, H. P. & W. C., Transparent Soap.
Rowe, M. & J. M., Brooms and Whips.
Cowperthwaite, Thomas & Co., Maps.
Newton, Isaac, sample of Indian Corn.
Mayall, John E., Daguerreotypes.
Kimber, A. M. & Co., Fine Wool.
McHenry, James, Soapstone.
Langenheim, W. F., Photograph Magic Lantern Slides.
Gamble Brothers, Morocco Leather.
Ragan, Wm., Reclining Chairs.
Dunton, J. H., Cedar Bedstead.
Rogers, C. B., Ploughs.
Brown & Wells, Tools.
Hart, Montgomery & Co., Paper Hangings.
Powers & Weightman, Chemical Preparations.
Reed, Isaac & Son, Gold Pens.
Jones, White & McCurdy, Artificial Teeth.

Boston.

Chilson, Richardson & Co., Air-warming Furnaces.
Doe, Hazelton & Co., Centre Tables.
Pond, Moses & Co., Cooking Ranges.
Sayles, Merriam & Brewer, Cotton Cloths.
Ward, Wm. & J. W., Copper Ore.
Fogg & Burbank, Pegged Boots.
Shattuck, Wm. G., Desks and Chairs.
Upham, Appleton & Co., Ginghams, etc.
Hobart & Robbins, Types, Printing, etc.
Reed, Chadwick & Dexter, Printing Cloths.
Prouty & Mears, Ploughs.
Sutton, J. A., Purchase Blocks.
Warner, R. & Co., Brooms and Wooden-ware.
Emerson, F., Ship Ventilators.
Gemunder, George, Violins.
Gilbert & Co., Pianos.
Paige, J. W. & Co., Prints and Calicoes.
Howe, S. G., Books for the Blind.
Johnson, Sewall & Co., Flannels.
Maynard & Noyes, Inks.
Skinner, F. & Co., Cassimeres.
Whipple, John A., Daguerreotypes.
Lawrence, A. & A. & Co., Manufactures.
Almy, Patterson & Co., Cottons.
Chickering, J., Pianos.
Hooper, Henry N. & Co., Epergnes in Ormolu and Castings.
Morey, Charles, Sewing and Spike Machines, etc.
Stimson, G., Jr., Gold Pens.
Adams, Wm. & Co., Bank Locks.
Bond, Wm. & Son, Electric Clocks, etc.
Riddle, Edward, Carriages.
Bradley, B. & Co., Bookbinding.
Baker, J. B., Harness.
Parker, Wilder & Co., Blankets.
Lawrence, Col. T. B., Carving Knife and Fork.
Hitchcock, Dr. D. K., Mineral Teeth.
Lee, J. & Co., Linseed-oil Cake.
Mears, Granville, Lard Oil.
Moore, William, Soaps.

Cincinnati, Ohio.

Bartlett, R. M., Banking Tables.
Corneau & Son, Catawba Wine.
Duhme H., Catawba Wine.
Emory, Thomas, Lard Oil and Candles.
Frank, F., Lard Oil.
Spratt, James, Lightning Rods.
R. Buchanan, Catawba Wine.
Williams, N. L., Hemp-dressing Machines.
Yeatman, T. H., Catawba Wine.
McGregor & Lee, Bank Locks.
Morrell, Stewart & Co., Sheet Iron.
Holbrook & Stanley, Winter-strained Lard Oil.

and firms. After some vexatious and damaging delays, the formal opening took place on the 14th of July, 1858, though the building itself was not then completed, and barely half the articles intended for exhibition were in position. In consequence, in part, of the delay in opening, the exhibition was not a commercial success; but its influence upon industry, especially manufacturing industry, was undoubtedly beneficial and wide-spread. A list of the articles exhibited and the names

Louderback, M. S., Preserved Peaches.
Schooley & Hough, Hams and Shoulders.

ALBANY.

Dean, Amos & Co., Argilla Knobs, etc.
Emory & Co., Seed Planter.
Goold, James & Co., Pony Sleigh.
Learned & Thatcher, Stoves.

BALTIMORE.

Chapman, J. L., Glassware.
Hyde, F., Fancy Soaps.
Hussey, Obed, Reaping & Mowing Machine.
McMullin, John, Netting Machines.
Maryland Soapstone Co., Soapstone.

MISCELLANEOUS.

Amoskeag Manufacturing Co.—Manchester, N.H.—Tickings, etc.
Chapin, W. J.—Fall River, Mass.—Printed Calicoes.
Stafford, J. R.—Cleveland.—Steam-dried Corn Meal.
Goddard Brothers.—Providence, R.I.—Cotton Goods.
McCormick, C. H., Chicago, a Grain Reaper.
American Chair Company.—Troy, N.Y.—Chairs with Patent Springs and Railroad Car Seats.
St. John, John R.—Buffalo, N.Y.—Self-determining Variation Compass.
Pratt, Zadock.—Prattsville, N.Y.—Samples of Leather.
Oswego Starch Company.—Oswego, N.Y.—Samples of Starch.
Wells, Levi.—Rochester, N.Y.—Agricultural Implements.
Woodcock, F.—Brooklyn, N.Y.—Floor Oilcloth.
Atlantic Dock Mills.—Brooklyn, N.Y.—Flour and Farina.
Leach, M. S. & H. J.—Lyons, N.Y.—Extra Genesee Flour.
Hotchkiss, H. G. & L. B.—Lyons, N.Y.—Oil of Peppermint.
Hill, Charles J. & Son.—Rochester, N.Y.—Extra Genesee Flour.
Trenton Iron Company.—Trenton, N.J.—Iron Wire, etc.
Hall & Spear.—Pittsburg, Pa.—New Iron Centre Plough.
Dumont, F. S.—Paterson, N.J.—Silk Plush for Hats.
Fay & Co., J. A.—Norwich, Conn.—Planing and Moulding Machinery.
Colt, Samuel.—Hartford, Conn.—Repeating Fire-arms.
North Wayne Scythe Company.—Mass.—Scythes.
Robbins & Lawrence.—Windsor, Vt.—Rifles.
Ryle, John.—Paterson, N.J.—Floss and Sewing Silk.
Adirondack Manufacturing Company.—Jersey City.—Iron and Steel.
McAllister & Tannehill.—Louisville, Ky.—Mustard.
Hayden, Whiting.—Willimantic, Conn.—Drawing Frame for Cotton.
Washburn, Ichabod & Co.—Worcester, Mass.—Card-wire.
Loring, George.—Concord, Mass.—Water Pails.
Atwood, G. B.—Taunton, Mass.—Black Lead Crucibles.
Lowell Machine Shop.—Lowell.—Power Loom Lathe, etc.
Earle, T. K. & Co.—Worcester, Mass.—Machine Cards.
Ashmead & Hurlburt.—Hartford, Conn.—Machine-made Gold Foil.
Pratt, Julius & Co.—Meriden, Conn.—Ivory veneer cut by machinery.

of the exhibitors can be found in a folio volume published by G. P. Putnam, and entitled "Progress of Science and Mechanism," and the preeminent, or especially noteworthy, articles are referred to in a duedecimo edited by Horace Greeley, of New York, entitled "Art and Industry of the Crystal Palace."

The New York Exhibition was followed by one at Munich, in 1854; at Paris, in 1855; and at Manchester in 1857; but the most important one of all was the late English Exhibition held in London in 1862. It was designed that the Exhibition should consist principally of works produced since 1850; but, in consequence of the distracted state of the country, American art and industry were poorly represented, there being only about seventy exhibitors from the United States in about twelve of the industrial classes.[1]

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(1) The exhibitors of manufactured goods were as follows:

Richards, W. D.—Boston, Mass.—Machine for Sole cutting and Heel trimming.
Sanford & Mallory.—New York City.—Flax and Fibre dressing Machines.
Wemple, P. H.—Albany, N.Y. — Spacing and Boring Machine.
Worthington and Lee.—New York City.—Duplex Pump.
Porter, C. T.—New York City.—Engine and Governor.
Lee & Larned.—New York City.—Steam Fire Engine.
Blake,Brothers.—New Haven,Conn.—Stone Breaking Machine.
Sanborn, G. H.—Boston, Mass.—Rope and Card Machines.
Gore, J. C.—Jamaica Plains, Mass.—Belt Shifters.
Degener, F. O.—New York.—Card and Job Printing Press.
Gibson,A.G.—Worcester, Mass.—Improved Carriage Coupling.
Sickels, F. E.—New York City.—Steam Steering Apparatus.
Ross, J.—Rochester, N.Y.—Conical Burr Stone Mills.
Conroy, E.—Boston, Mass.—Cork-cutting Machine.
Douglass Axe Company.—Mass.—Axes and Cutlery.
Beardsley, Levi A.—New York.—Hay and Earth Elevator.
McCormick, C. H.—Chicago, Ill.—Reaping, Mowing, and Self-raking Machine.
New Jersey Zinc Co.—Newark, N.J.—Zinc ores, Iron and Steel.
Bagley, M. H.—New York City.—Crystal Carbon Oil.
Pease, S. F.—Buffalo, N.Y.—Oils.
Rhodes, B. M.—Baltimore.—Superphosphate Lime.
Hecker Brothers.—New York City.—Samples Flour.
Stebbins & Co.—Rochester, N.Y.—Plows.
Onondaga Salt Co.—Syracuse, N.Y.—Salt.
Glencove Starch Company.—New York.—Corn Starch.
Oswego Starch Company.—New York.—Prepared Corn.
Lawrence & White.—Melrose, N.Y.—Lock nut and Ratchet-washer.
Holmes, J. E.—New York City.—Improved Pneumatic Despatch.
Hoadley, J. C.—Lawrence, Mass.—Trucks for Locomotives.
Remington, E. & Sons.—Ilion, N.Y.—Revolving Stereoscope Machine.
Brewster & Co.—New York City.—Phaeton and Road Wagon.
Wheeler & Wilson.—New York City.—Sewing Machine.
Singer, I. M.—New York City.—Sewing Machine.
Willcox & Gibbs.—New York City.—Sewing Machine.
Howe Sewing Machine Company.—New York City.—Sewing Machine.
Goodwin, C. R.—Boston, Mass.—A Machine for sewing Leather.

Smith, A. — West Farms, N.Y. — Power Loom for weaving Tufted Piled Fabrics.

Darling & Schwartz.—Bangor, Me.—Steel Scales and Rules.

Steinway & Sons.—New York City.—Grand and Square Pianos.

Hulskamp, G. H.—New York City.—Violins of improved construction.

Gardner, Brewer & Co.—Boston, Mass.—Shirtings.

Manchester Print Works.—N.H.—Cotton Prints.

Kohnstamm, J.—New York.—Leather and imitations of Leather.

Bertram, F. M. B.—New York City.—Invalid Reclining Chairs.

Green, W. H.—Meriden, Conn.—Revolving Castor.

Brown, J. A. & Co.—New York.—Plated Lockets.

Hartell & Letchworth.— Philadelphia.—Preserved Fruits.

American Bank Note Company.—New York City.—Bank-note Engraving.

Watts, A. J.—New York.—Crystal Gold Foil.

Dunham J.—New York City.—Boudoir Pianos.

Colt's Patent Fire-arms Co. —Hartford, Conn.—Guns and Pistols.

Kirby & Osborne.—Auburn, N.Y.—Reaper and Mower.

Batchellor & Sons.—Wallingford, Vt.—Hoes, Forks, and Rakes.

S. Sweet.—New York.—Newspaper addressing Machine.

J. J. Eckell.—New York City.—Combination Press and Compress.

G. H. Sanborn.—Boston, Mass.—Spindle Banding Machine and Iron Refrigerator.

Crosby, C. O.—Boston.—Crimped Ruffling Machine.

STATISTICS

OF THE PRINCIPAL

MANUFACTURING CITIES AND TOWNS IN THE UNITED STATES.

COMPILED FROM THE

CENSUS RETURNS FOR THE YEAR ENDING JUNE 1, 1860.

WITH

DESCRIPTIONS OF REMARKABLE MANUFACTORIES.

[These Statistics were prepared expressly for this work, with the exception of Philadelphia and New York, by Edward Young, Esq., Chief of Division of Statistics of Manufactures in the United States Census Office, and have never before been published, officially or otherwise. Doubtless there are errors and omissions; but the blame must be attached to the Government Agents employed in taking the Census, and not to the compiler, who cannot go behind the official returns.]

MANUFACTURES OF PHILADELPHIA.

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Products.
Agricultural implements	7	$67,800	$46,542	83		$142,910
Alcohol and camphene	9	190,900	444,275	76		662,418
Artificial limbs	7	42,000	11,000	38	9	52,900
Artificial teeth	12	284,800	176,831	89	71	323,908
Bakers' bread and crackers	346	755,605	1,314,537	878	34	2,214,836
Blacking and ink	9	184,000	169,665	66	86	265,380
Bolts and rivets, wrought iron	7	170,500	159,390	318		410,000
Bone black	3	111,000	106,156	82		192,000
Bookbinding and blank books	54	505,100	336,742	596	594	949,778
Book publishing	42	1,914,500	741,000	603	241	2,260,400
Boots and shoes	701	1,730,815	1,912,657	6,497	1,937	5,329,387
Brass founders	31	350,150	274,024	310	10	571,800
Breweries	68	2,122,600	1,102,733	593	3	2,223,425
Britannia ware	3	50,600	28,620	68		76,900
Bricks, common and pressed	49	1,208,500	70,625	1,876		1,212,196
Bricks, fire	5	50,600	24,975	89		77,999
Brooms, corn	7	51,850	58,461	88		132,800
Brushes	31	206,400	203,298	384	75	415,084
Caps, men's and boys'	16	111,550	84,565	53	320	258,150
Cards, playing, printers', etc.	4	44,000	80,553	83	59	134,600
Carpets	124	882,625	1,393,771	1,925	755	2,915,618
Carriages and coaches	52	610,600	396,321	1,038		1,051,871
Cars, for railroads	4	358,500	188,507	421		494,378
Car wheels and axles	2	540,000	235,300	120		393,600
Chemicals	35	1,861,000	1,544,316	702	35	2,769,254
Clothing	352	4,369,575	5,147,314	6,309	8,073	9,964,497
Coffee, roasted and ground	6	33,500	417,200	27		528,600
Combs, tortoise-shell and other	9	17,700	18,673	51		66,900
Confectioners	39	234,400	312,663	250	58	561,250

Manufactures.	No. of Establishments.	Capital.	Cost of raw material.	Male hands.	Female hands.	Value of Products.
Coopers' work	75	$213,832	$201,725	460		$483,681
Copper work	9	84,500	77,240	75		148,000
Cordage, hemp and flax	7	187,800	131,330	183	3	252,850
Cotton goods, cloths, with power	51	2,191,000	2,053,740	1,991	2,802	4,347,645
Cotton goods, hand looms	18	69,000	84,048	161	400	258,743
Cotton and woolen goods, power	51	1,059,600	2,021,813	1,704	1,554	3,593,326
Cotton and woolen goods, hand looms	5	31,500	42,100	78	22	98,000
Cotton webbing, tape, braid, &c.	7	157,800	131,616	74	152	262,960
Cotton and woolen machinery	6	273,700	120,954	397		490,000
Cured meats	23	1,145,500	3,510,415	238		4,575,807
Cutlery, steel tools, files, &c.	22	56,600	40,895	88	1	119,425
Distillers and rectifiers	39	712,400	1,171,516	136		1,499,031
Dyers, wool and cotton	35	174,191	200,396	214	26	801,582
Earthenware	14	59,000	29,922	102		106,010
Fertilizers	12	106,400	107,570	62		207,450
Fire engines	2	40,000	16,500	45		43,000
Flour mills	30	614,860	2,648,645	198		3,098,328
Furniture, cabinet or household	161	1,008,550	638,623	1,613	14	1,854,436
Fur manufactures	29	312,000	171,504	80	165	371,650
Gas works	3	3,956,248	586,200	363		1,837,500
Gas fixtu's, chandeliers, etc.	15	1,131,900	533,420	1,099	32	1,680,150
Glass, window, bottles, etc.	8	635,000	341,750	825		1,069,000
Gloves, of buckskin	5	29,600	22,996	19	86	50,800
Glue, curled hair, etc.	4	579,000	179,600	493		560,006
Gold leaf and foil	8	91,500	146,240	73	50	224,600
Gold watch cases & chains	23	741,500	1,103,856	578	46	1,714,800
Guns and pistols	25	110,000	82,382	223	2	251,150
Haircloth	3	65,500	51,100	25	85	102,040
Hats; wool, silk, and fur.	61	355,300	546,866	627	371	1,164,223
Hatters' trimmings	2	7,000	8,700	6		14,500
Hosiery, woolen	71	822,200	749,684	785	1,500	1,738,395
Hosiery, cotton	31	25,760	43,763	72	76	104,450
Ink, printers'	4	72,000	34,100	26		88,000
Iron castings:						
Building foundries	3	175,000	74,150	194		247,000
Gas and water pipe	2	155,000	150,000	160		250,000
General foundries	14	232,250	158,597	233		295,863
Stoves and hollow ware	8	909,000	508,800	956		1,306,700
Iron railings	13	297,400	118,904	192		283,520
Iron rolling-mills, bar, sheet, and plate	5	535,000	668,790	605		1,110,000
Iron rolled tubes, flues, &c.	3	258,000	378,879	293		539,247
Iron wire and ornamental work	17	54,900	47,848	101	3	115,794
Jewelers and watchmakers	71	567,600	247,830	414	18	691,430
Lampblack	4	41,800	22,380	34	2	62,792
Lead pipe, shot, and lead-smelters	4	275,000	414,700	48		638,500
Leather, in all forms	84	1,948,450	2,661,304	1,170	156	4,022,858
Locomotives	2	1,650,000	696,500	1,255		1,420,000
Machinery, general, of iron	61	1,244,800	737,727	1,613		1,862,000
Machinists' tool manufac's	2	480,000	70,274	370		403,000
Mahogany mills	2	240,000	134,200	125		265 000

REMARKABLE MANUFACTURING ESTABLISHMENTS IN PHILADELPHIA.

The Bridesburg Machine Works and Armory.

ALFRED JENKS & SON, PROPRIETORS.

In the first volume of this history we referred more than once to the important part performed by the Hon. Joseph Jenks, Governor of Rhode Island, in the early fabrication of Iron in this country. A lineal descendant of his, Mr. Barton H. Jenks, is now proprietor of one of the most complete works for the manufacture of Cotton and Woolen Machinery, and of Fire-arms, in operation in the United States,—the Bridesburg Machine Works.

The founder of this establishment, Mr. Alfred Jenks, was a pupil and colaborer for many years with the celebrated Samuel Slater, who erected the first cotton-mill in Pawtucket, R.I. In 1810, Mr. Jenks removed to Holmesburg, Pa., taking with him drawings of every variety of cotton machinery, as far as it had then advanced in the line of improvement, and commenced its manufacture. The first mill started in this portion of the State of Pennsylvania was supplied by machinery constructed by him, and was situated in Lagrange Place, near Holmesburg. In 1816, he built a number of looms for weaving cottonades for Joseph Ripka. Under the universal impetus given to home manufactures during the last war, Mr. Jenks greatly extended his business operations, and in 1819 or 1820 removed to his present desirable location in Bridesburg, the increased growth of which is owing in no small degree to the personal efforts and enterprise of himself and the importance of his establishment. Here, where he possessed the necessary facilities for shipping to his more distant patrons, he conveyed his old frame building from Holmesburg on rollers, which yet stands amid the more substantial and excellent structures beside it. When the demand first arose for woolen machinery in Pennsylvania, Mr. Jenks answered it, and at once commenced its manufacture, and furnished the first woolen mill started in the State, by Bethuel Moore, at Conshohocken, with all the machinery necessary for this manufacture.

In 1830, he invented a power-loom for weaving checks, and introduced it into the Kempton Mill at Manayunk, where its success produced such excitement among hand-weavers and others opposed to labor-saving machinery as to cause a large number of them to go to the mill with the avowed purpose of destroying it, from doing which they were only prevented by the presence of an armed force. This and other improved machinery made by Mr. Jenks soon acquired an extended reputation, and induced the erection of larger buildings; and now the establishment is one of the most extensive and important in this country. Since the decease of Mr. Alfred Jenks, and for several years previously, the business has been conducted by his son, Mr. Barton H. Jenks, to whom, if eulogy were admissible, we might refer as the type of a model manufacturer,—fertile in invention, skillful in mechanism, liberal, just and public spirited,—one, indeed, who throws around the pursuit of manufacturing something of the lustre and glory which the mercantile profession borrowed from the genius of Giovanni de Medici.

To attempt a recital of the various inventions and improvements which this firm have made for the benefit of cotton and woolen manufacturers, would carry us too far beyond our limits. Of Looms they manufacture a large number of different styles, ranging from the single shuttle or ordinary loom, through the more intricate forms of two-shuttle looms for weaving checks, three and four shuttle looms for weaving ginghams and other fabrics requiring a corresponding number of colors in the weft, to the more enlarged carpet loom; and all of these embrace in a greater or less degree improvements and advantages not possessed by looms manufactured elsewhere. The several improvements in the looms are covered by seven distinct patents; and the main features accomplished by these inventions, so far as they relate to the two, three, and four shuttle looms, may be said to consist in the expeditious manner of moving the shuttle boxes to change the picks of weft, and, by certain new constructions, combinations, and arrangement of parts essential to this operation, and to others of an important character, by which almost as many picks of weft can be made by these two, three, and four shuttle looms as by the single shuttle loom. As an exemplification of this it may be stated that so perfect is the arrangement of the various parts of these latter description of looms, and the principle upon which they work, that they make 130 picks of weft per minute where the same class of ordinary looms only make 110.

The looms for weaving the more elaborate and fancy character of goods are also perfect in their operations, particularly the loom for weaving damask table-cloths, napkins, and articles of a like character, and the carpet-loom. This latter has thirty-two shuttles, and is capable of laying sixteen different colors in the figure, and an equal number of colors in the ground of the carpet.

The self-stripping cotton and woolen carding engines manufactured at this establishment, are different from the carding machines generally used. Instead of delivering the cotton or wool to the main cylinder as heretofore, it is, after being fed to the machine by rollers, passed to the "licker-in" cylinder, by which it is delivered to the main cylinder, whence it is successively retaken with its dirt, redelivered to the main cylinder by additional cylinders, arranged in the same relation to the periphery of the main cylinder as the first-mentioned "licker-in" cylinder, and driven by stripper heads at the ends of the cards, at variable speeds, so as to enable the dirt to detach itself from the cotton or wool during its increased speed with the additional card cylinders, and drop into a receptacle below. In this manner these cylinders are made to act as self-acting cleaners to the cotton and main cylinder card, and this avoids the necessity of the usual and constant hand-stripping to effect this object, and the consequent loss of time, besides enabling the cotton or wool to be more regularly laid and thoroughly cleaned. This effective method of cleaning the cotton and main card cylinder by delivering the former on to the latter successively at two and three different points, was originally projected and patented by Messrs. Gambrill & Burgy, in 1855, and subsequently improved and brought to its present perfect state by Mr. Barton H. Jenks in 1857; and in consequence he became interested with them under a reissued patent. He also added doffing rollers, to take the place of the usual comb for delivering the cotton or wool. For these he has also obtained a patent. By this system of delivering, an increased speed can be given the card, without danger of injury to the staple, over that attained where the comb is employed.

For several years Mr. Jenks has been experimenting upon and constructing the necessary machinery to complete a cylinder *Cotton-gin*, which gives promise of producing one of the most extraordinary improvements in the process of ginning the raw material that has been devised since the advent of Whitney's Saw Gin. It is well known that in ginning cotton with the ordinary gin the violent action of their teeth in dragging it between the bars tears the staple and injures it in a corresponding degree. The injury thus done the cotton has been variously estimated at from three quarters to one cent per pound,—a loss that swells the sum total to several millions of dollars on a full crop in this country. Now, the object of this new form of Gin is to do away with the usual shaft of saws, and substitute for them a peculiarly constructed cylinder, its outer periphery consisting of numerous and regularly set angular steel wire teeth, imbedded in Babbitt metal, in positions inclined to the direction of the cylinder's motion, so that after the cylinder, or rather the outer ends of the teeth are ground down and finished, each tooth will present a separate, sharp, and smooth point, tangential to the periphery of the cylinder. These teeth are so close together that nothing but cotton can be secreted between them.

This leads us to notice a most ingenious and extraordinary machine, made at this manufactory, for puncturing the cylinders of thick paper and preparing and setting therein the angular teeth preparatory to casting around their inner ends the cylinder of Babbitt's metal, in which they are imbedded to form the alloyed cylinder of the cotton-gin. While witnessing its operation, and its parts performing functions requiring the greatest nicety and regularity of movement, to grasp the wire and successively carry it through a variety of intricate operations that would seem impossible except to the manipulation by hand of the most skillful person, one cannot but pay homage to the genius, skill, and patience of its author. Its complex character will prevent us, of course, from giving a minute description of it; but we will endeavor to state, in the regular order in which they take place, the several operations necessary to finally set these angular wire teeth in their alloyed base on the periphery of the cylinder.

The paper cylinder in which the teeth are first set is the same or a little greater length than the alloyed base of the cylinder, and is designed to receive 95,000 teeth. This paper cylinder is placed on circular heads, through which a main shaft moves loosely,—one of these heads, on part of the periphery of which a screw is formed, so as to actually make it a screw nut, has a cog or tongue on it, which enters a longitudinal groove in the hollow shaft, so as to cause it to revolve with the shaft and yet move freely over its surface longitudinally. This screw nut meshes in gear with the nicks on two parallel partially flattened screw shafts, arranged on either side of the main shaft and parallel thereto, which screw shafts can be turned on their axis to disengage their screw nicks from gear with the screw nuts, and bring blank flattened surfaces next it, so as to be run back quickly after it has performed the necessary forward movement, through the agency of a ratchet and gearing, with the accompanying paper cylinder, to set all the teeth designed for it therein. The wires, previously brought to the angular edge desired, are wound on two reels, hung on journals above the machine, and are passed between movable nippers or pincers, which are caused to move back and forth at intervals by a lever or cam, clamping or griping the wires, in their movement from the front, and releasing their hold in returning. Thence the wires continue under clamps, by which they are held during the return movement of the nippers, and from which they are released during the opposite movement, to allow the free passage of the said wires between guides, into corresponding openings in a peculiarly formed oscillating arm termed a carryer, whose oscillating movement is constant over the extent of a quarter of a circle, except a slight rest or stoppage at the termini of each stroke, sufficient to receive the wires, and allow them to be cut off at the proper lengths by cutting snips in the guides immediately next it, and the punches to force the cut teeth out of it into the previously made punctures in the paper cylinder. This peculiar oscillating movement of the carrier, with its stoppages, is produced by means of a series of scroll cams, operating on a toothed or partially-cogged wheel on the front end of the carrier-shaft. Simultaneous with the inward movement of the nippers with the wires grasped between them, two horizontal punches are pushed inward and entirely through the paper cylinder, on lines tangential with its periphery, in order to make the necessary holes or punctures for the reception of the teeth, the paper cylinder being clamped, during this operation, as well as during the subsequent operation of setting the teeth therein, between the end of a back rest and a stationary head, to prevent it from turning, from whose grasp it is released after the two objects of puncturing the cylinders and setting the teeth have been accomplished. As the carrier descends, the crop-head containing the punches is raised so as to take the puncturing punches out of range of the paper cylinders, and the reciprocating bar by which they are moved, and bring the other punches on the same horizontal plane they previously occupied, so as to force the teeth from the carrier into the punctures previously made for them. In this manner the several parts of the machine are made to act in concert from a regular motion, the paper cylinder being turned and moved forward at proper intervals by the before-mentioned ratchet and suitable gearing, and the several operations of moving the wires into the carrier the proper distance to form the teeth, cutting them off, puncturing the paper cylinder with suitable holes for their reception, carrying them opposite these holes, setting them therein, and the intermediate duties of the various parts being performed at the proper intervals of time, and in the regular order, to enable the machine to set the extraordinary number of two hundred and forty teeth in the cylinder per minute. After this paper cylinder is set or studded with 95,000 teeth, it is removed from the machine and placed concentric with a metallic cylinder, the inner ends of the teeth which project inward equally from the inner periphery of the paper cylinder, while their outer ends are flush with the outer one, serving to keep it in its proper relation to the metallic cylinder, during the pouring of the Babbitt metal around the same and between it and the paper cylinder and ends of the teeth, to which it forms a base or bed. In pouring the metal the channel through which it passes is such as to cause it to first descend to the bottom of the metallic cylinder, and then rise outside the same through and between the ends of the teeth, so as to allow the escape of the air before it. When the metal is cooled and set, the paper cylinder is wet and softened, and turned off, and the outer ends of the teeth are ground to give them the peculiar sharp form and uniform length before mentioned.

There are numbers of other new machines and improvements in this establishment for assisting in the work intended for the machinery they manufacture, but we must limit our notice to two of them. The first of these is an attachment of additional tools to the mandrils of drills, and is so very simple and effective as to astonish the beholder. The design of this improvement is to finish the hubs of cog-wheels, pulleys, etc., and the mandril is so formed as to admit of the attachment of a frame or stock containing a facing tool, a chamfering tool, and a tool for turning the outside of the hub, arranged in such relation to each other as to enable the entire operations named to be performed simultaneously, and by one descent of the mandril. The boring and reaming tools can also be added, and the drill made to perform these additional functions at the same time, one man being able, under this process, to attend to two drills. This is not only a decided labor-saving improvement, but is advantageous in this respect, that the combined work performed through it is more accurate than if the tools were set separately, and each part of the work done singly, as heretofore.

The other machine referred to is an automatic cutting engine for cutting either plain or bevel cog-wheels and pinions. This machine can be adjusted to cut any sized cog, on any sized wheel, by simply detaching a segment cogged plate or curb, which acts to turn the platen and hub with the wheels to be cut, the proper distance to correspond with the distance apart of the intended cogs, and substituting another of the requisite size,—the feature of turning the platen and hub and wheels to be cut the required distance being effected and regulated by the cogged segment or curb. The extent of the up-and-down travel of the platen and hub is also adjusted to correspond with the thickness and number of wheels to be cut, by means of a sliding box, to which the raising chain is attached, and which is secured and capable of being moved in a slot or groove in the oscillating arm through which the platen and hub receive their movement. Any number of cog-wheels, whose combined thicknesses are not greater than the movement of the platen, can be placed and secured on the hub, and after the machine is adjusted, it can be started and left to automatically cut, without any attendance whatever, the entire cogs of the wheels in the most accurate and beautiful manner. In case it is desired, the parts can be modified and the machine adjusted to the cutting of bevel cog-wheels.

In addition to the manufacture of Cotton and Woolen Machinery, this firm, as we have already stated, is largely engaged in the manufacture of FIRE-ARMS. When the present attempt was made to destroy the integrity of our National Government, Messrs. Jenks, with that versatility and adaptation to circumstances peculiar to the American character, set about providing the necessary facilities for the manufacture of muskets on the most extensive scale. They erected an immense building with four wings, having a length of 920 feet, and filled it with all the best and most approved machinery, which is driven by two engines, one of 150, and another of 80, horse-power. Here are conducted all the operations necessary to the manufacture of a musket, and how numerous the processes are will be inferred when we state that to make the barrel from the rough metal requires forging, drilling, welding, turning, rifling and polishing; and to make the stock from the plank requires seasoning, sawing, turning, smoothing, adjusting, and mounting, while the lock contains an endless variety of mysteries which to the uninitiated present a hopeless complication of technicalities. Each and every of these parts, however, must be forged and hammered, tempered and adjusted with the utmost nicety, and must finally undergo a rigid inspection which will detect the slightest flaw. One of the buildings is devoted to forging the various parts, and here are the ponderous trip-hammers which are used in preparing the metal for its subsequent treatment, and the drop-hammers, which are used in preparing Lock Plates, Guard Plates, Washers, Guard Bows, Nuts, Cone Wrenches, Tumblers, Punches, Band-springs, and all the various appurtenances of the lock. None but the very best material is ever used, the finest cast steel and Norway iron alone being admitted; and so strict are the requirements that every part, however minute, must conform exactly to a pattern or guage, both in quality and finish, that any deviation is followed by the rejection of the part to the loss of the workman under whose charge it was made. After the pieces are forged they pass into the hands of those who are to prepare them for service. The first floor of the main building is occupied with the milling machines, barrel borers, and riflers, and barrel filers. The second floor is occupied by the filers, polishers, and lock assemblers, and the inspectors of the various parts are disposed of in the wings. Machinery for sawing, turning and fitting the stock are located in the extreme western wing of the manufactory, and a separate building is used for drying and seasoning the lumber. In the establishment there are 86 different kinds of labor-saving machines in constant use; but notwithstanding these, several hundred men are employed in the works.

The Springfield rifle musket, as it is termed, is now the favorite weapon of the Government, being in some respects superior to the Minie rifle, and this is the weapon Messrs. Jenks are now manufacturing at the rate of about 5000 muskets per month.

Since 1860 Mr. JOSEPH G. MITCHELL, formerly Cashier of the Mechanic's Bank, Philadelphia, has been associated with Mr. Jenks in the proprietorship of these works and manages the financial affairs with distinguished ability, acquired by long experience.

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M. W. Baldwin & Co.'s Locomotive Works.

THESE are among the oldest and most prominent of the manufacturing establishments of Philadelphia. Mr. Baldwin, the founder of these works, is accredited with having constructed the first successful locomotive ever made in the United States.

The first locomotives brought into the United States were imported from England in the fall of 1829 or the spring of 1830 by Horatio Allen, of New York, and one of them was set up on the Delaware and Hudson Railroad at Carbondale, Pa.; but, being found too heavy for the track, its use was abandoned. The first locomotive constructed in this country was built at the West Point Foundry, at New York, in 1830, for a South Carolina railroad, and named the *Phœnix*. A second engine was built the same year by the same establishment, and for the same road, and named the *West Point*. In the spring of the same year an engine was built for the Mohawk & Hudson Railroad, from Albany to Schenectady, and called the *De Witt Clinton;* and this was the first locomotive ever run in the State of New York. But none of these, we are told, worked successfully, and the first successful locomotive made in this country, we believe, was one made by Mr. Baldwin, in 1832, on an order from the Philadelphia & Germantown Railroad Company, and placed on that road in January, 1833. It ran a mile in less than a minute, and its performance was not exceeded for years after. The business having been thus commenced, the successful experimenter proceeded to procure the necessary tools, patterns and fixtures for its extension as rapidly as they could be obtained, and to erect the shops on Broad above Callowhill St., now occupied as the works, which were completed in 1834. In the first year after their erection, fourteen locomotives were manufactured; in 1836, forty; and thenceforward the business, varying with the circumstances of the times, has progressed and prospered with the development of railroad enterprise throughout the country, until now the firm employs eight hundred hands, and produces machinery equal to one hundred and twenty Locomotives per year.

Our readers who may have examined the list in this History, of important inventions patented within the last twenty years, will have noticed that the name of Matthias W. Baldwin occurs more than once. The plan of attaching the cylinders to the outside of the smoke-box, now almost universally adopted, originated with him; and also the metallic ground joints, and various minor improvements, upon which the present perfection of the Locomotive Engine depends.

In 1842, Mr. Baldwin introduced the six and eight-wheel connected engine, with an arrangement of truck for adaptation to the curves and undulations of the road. The Superintendent of the largest coal freighting road in the United States says of these: "They are saving us thirty per cent. in every trip on the former cost of Motive or Engine Power."

The proprietors of these works have for years been engaged in perfecting a system of engines, by means of which they could be adapted to economical working on almost any grade or curve. Several distinct kinds, and numerous sizes of each kind, from three to thirty-five tons weight, are manufactured with from two to eight driving-wheels. The system of adaptation, and its advantages, are seen in its results. On the Pennsylvania Railroad, Eastern Division, where the grades are moderate, a passenger engine has been running, over eighteen months, one hundred and thirty-three miles per day without the loss of a trip for repairs.

On a railroad crossing the Blue Ridge, engines of this firm's construction have been ascending grades rising at the rate of 296 feet per mile, and swinging trains of eight-wheel cars carrying forty and fifty tons of freight and passengers, around curves of less than 300 feet radii, performing their appointed duty, without a single failure, for years, and establishing the claim of the American locomotive in climbing steep grades to unrivaled pre-eminence.

During the present year (1863), this firm have made large additions to their buildings and facilities for manufacturing. They erected a Foundry 109 by 90 feet, are now building a three-story Erecting shop, 206 feet on Broad street, 183 feet on Willow, and 68 feet on Hamilton street, and propose to build a Smith shop 180 by 160 feet.

Since 1854, Mr. Matthew Baird has been associated with Mr. Baldwin in the proprietorship of these works, and has been the active managing partner. The ability with which he has filled this onerous and responsible position is evidenced by the increased prosperity of the establishment, which now affords employment to so many hundreds of the best mechanics in Philadelphia.

A. Whitney & Sons, Car-Wheel Manufactory.

This is, we believe, the largest establishment in the United States devoted exclusively to the manufacture of Car Wheels. The works are located on Callowhill St. and Sixteenth, and have capacity for making 75,000 wheels per annum. The moulding room is four hundred feet long and sixty wide, and we know of none larger in the country. Two railways extend its entire length, on which carriage cranes are propelled and used for removing the molten iron from the furnaces to the moulds, and the wheels from the moulds to the cooling-pits. There are five large furnaces, three of which communicate by tubes with an immense caldron for containing melted iron. There are thirty-six cooling-pits, having a capacity for holding at a time two hundred and fifty wheels.

In 1848, Mr. Asa Whitney, as we have elsewhere stated, patented a process for cooling wheels, which secures results of the greatest importance. It has been described as follows: The wheels are taken from the moulds as soon after they are cast as they have become cool enough to bear moving without changing their form. In this state they are put into a circular furnace or chamber, which has been previously heated to a dark red heat. As soon as they are deposited in this furnace or chamber, the opening through which they have been passed is closed, and the temperature of the furnace and its contents is gradually raised about as high as that of the hottest part of the wheel when taken from the mould. All the avenues to and from the interior of the furnace are then closed, and the whole mass is left to cool as slowly as the heat will pass off by permeating through the exterior wall of the furnace, composed of brick four and a half inches thick, enclosed in a sheet-iron case one-eighth of an inch thick.

By this process every part of each wheel is raised to the same temperature before cooling in the furnace commences, and as the heat can only pass off through the medium of the wall and case enclosing it, all parts of the wheel cool and contract simultaneously. The time required to cool wheels in this way is three days. In this manner wheels of any form can be made with a solid hub, free from all inherent strain, and without the hardness of the chill being in the least impaired.

The furnaces used in performing this process of prolonged cooling are so constructed that the combustion of fuel used in heating them may be rendered more or less active at pleasure.

This firm employs one hundred and seventy hands, and manufactures over two hundred car wheels per day.

The Port Richmond Iron Works. I. P. Morris, Towne & Co., Proprietors.

This is one of the establishments to which Philadelphia is indebted for her reputation for ability to construct heavy machinery. Its existence may be said to cover the whole period of the manufacture of machinery by modern methods. In 1828, when Levi Morris & Co., the predecessors of the present firm, commenced business, many of the tools which are now deemed indispensable in every machine shop, even those of the most moderate pretensions, were scarcely known. At that time slide lathes and power drill presses were not in general use, and the only representative of the planing-machine in this country, it is believed, was to be found at the Allaire Works, in New York, originally built for fluting rollers. It was not until 1838 that a planer was purchased and fitted up in the Richmond works. In the Foundry department, the operations were also conducted with very imperfect and inefficient machinery compared with that now in use. Anthracite coal, which was introduced here about 1820, was by no means exclusively used for melting iron. The blowing machinery was of a very primitive character, with unwieldy wooden bellows and open tuyeres. The best product was not more than two thousand to three thousand pounds of iron in an hour, and in the course of the heat an average much below this. With the present improved blowing machinery, and improved furnaces, eight tons have been melted in forty-six minutes, with a consumption of coal of one pound to eight pounds of iron melted.

In 1846, the works were removed from Market and Schuylkill Seventh streets to their present location, which is on the Delaware River, adjoining the Reading Railroad Coal Wharves on the south. The buildings, which are of brick, occupy a lot having a front on the Delaware River of 145 feet, a front on Richmond street, or Point Road, of 260 feet, and an entire depth or length, from the Richmond side to the end of wharf, of 1,050 feet.

The remarkable feature in this establishment is the extraordinary size of the tools in use, and the perfection of the machines employed in the various shops. In the *Foundry* there are three Cupola Furnaces, the largest of which will melt twelve tons of iron per hour. In the *Machine Shop*, there is a Planing Machine capable of planing castings eight feet wide, six feet high, and thirty-two feet long; a Lathe that will swing six feet clear, and turn a length of thirty-four feet; and a Boring Mill, possessing also the qualities of a horizontal lathe, which will bore out a cylinder sixteen feet in diameter and eighteen feet long. This is believed to be the largest in America or Europe. In their

Boiler Shop they have one large Riveting Machine, and facilities for making boilers or plate-iron work, of every description that may be desired. But a few years ago, Steam Boilers, made of plate-iron, were riveted exclusively with hand-hammers; and when the City Water-Works were located at Centre Square, the steam boilers were built of wood, with cast-iron furnaces. At the present time, in this, as in the best shops, circular boilers are riveted in a machine, by pressure produced by a cam operating upon a sliding mandril. In their *Smithery*, they have a Nasmyth Steam Hammer for heavy forgings; a Tilt Hammer for light work; and throughout the establishment, the minor tools, consisting of Lathes, Boring Mills, Slotting and Shaping Machines, Planing Machines, Horizontal and Vertical Drills, etc., etc., are all of the best description, and combine the latest improvements.

The monuments of this firm's engineering ability are found in all parts of the country. Probably the largest engines for producing iron with anthracite coal ever built in this country, are the product of their works. For the Lackawanna Iron Works, at Scranton, Pa., they built two Blowing Cylinders, nine feet bore, and ten feet stroke, and Steam Cylinders fifty-four inches in diameter and ten feet stroke. For Seyfert McManus & Co's. furnace, at Reading, they built a direct high pressure Blowing Machine, the steam cylinder being forty inches in diameter, and blowing cylinder one hundred and two inches, both seven feet stroke of piston. For the Lehigh Crane Co., they built a Beam Condensing Engine, having a steam cylinder fifty-eight inches diameter, and a blowing cylinder ninety-three inches, both ten feet stroke of piston. The beam of this engine works on a column of cast-iron thirty feet high, and the whole is set upon a heavy cast-iron bed plate. For the Thomas Iron Works, they supplied two very large beam engines, the steam cylinders being sixty-six inches in diameter, and the blowing cylinders one hundred and eight inches diameter, and ten feet stroke. These, it is believed, are the heaviest ever made for the purpose. The large engines of the United States Mint, and the lever beam Cornish Pumping Engine at the Schuylkill Water Works, sixty inches diameter, ten feet stroke, were constructed at their works.

This firm also built the Iron Light House for the ship shoal, in the Gulf of Mexico, which was put up on screw piles, in water fifteen feet deep, and at a distance of twelve miles from land. The whole height of the structure, from the water to the top of the spire, was one hundred and twenty-two feet, and from the water to the focal plane, one hundred and seven and a half feet. The structure above the foundation to the deck, a height of ninety-three feet, was erected in their yard, complete in all its parts before shipping

For Lousiana and the West Indies, they have manufactured every variety of sugar apparatus and engines for sugar mills; and North Carolina they have supplied with a large number of their celebrated Gang Saw Mills, by which a log of yellow pine can be converted into flooring-boards by once passing through the mill. The gangs consist of twelve to twenty-four saws, driven by direct connections with a steam engine at a speed of one hundred and twenty to one hundred and forty strokes per minute. They are not much known, except at the South, but we think they would be found highly useful in the pine forests of New Jersey, and the Middle and Western States. Recently this firm has been largely employed in building engines for government vessels—the gunboats Itasca, Scioto, and Tacony; the Ericsson batteries, Sangamon and Lehigh, and the Iron-clad batteries, Monadnock and Agamenticus.

The firm of I. P. Morris, Towne & Co., is now composed of Isaac P. Morris, John H. Towne, John J. Thompson, and Lewis Taws. The first-named gentleman was born in 1803, was one of the original partners in the firm of Levi Morris & Co., who commenced business in 1828, and since that period has been identified with the manufacturing interests of Philadelphia. In his business career, he has been distinguished for a discriminating intelligence, inflexible honesty, and a laudable public spirit. Mr. J. H. Towne was formerly engineering partner of the firm of Merrick & Towne, and is an engineer of unquestioned ability. Mr. Thompson, who has been connected with the establishment for many years, has under his charge the finances of the firm. Mr. Taws has been connected with the concern since 1834, and until 1861, when Mr. Towne joined the firm, had exclusive control of the mechanical department of the establishment. He served his apprenticeship with Rush & Muhlenberg, the successors of Oliver Evans, and in early manhood went to New York, where he entered into the employment of the West Point Foundry Association, then under the superintendence of Adam Hall, a distinguished Scotch engineer. The present arrangement of the Port Richmond Works is the result of his experience.

The firm of I. P. Morris, Towne & Co. have a capital invested in their business of over $400,000, and employ about 400 hands. Their list of manufactures includes every description of heavy machinery except locomotives.

The Southwark Foundry. Merrick & Sons, Proprietors.

This is another of the remarkable machine establishments of Philadelphia. It was started in 1836 as a foundry for castings only, but was soon enlarged, and now the entire space occupied by buildings is 63,650 feet, with a yard-room of 80,550, making the entire space occupied by the establishment 144,200 square feet. In addition, it has a tract of land on the Delaware River, about 400 feet front and 1,100 feet deep, affording ample space for extensive iron boat yards; and on this tract there is a fine pier, 60 feet wide and 250 feet long, with a very powerful shears at the end, capable of lifting fifty tons.

A brief description of some of the objects of interest in this establishment will show that the arrangements, tools, and appliances in use, are on a scale proportionate to the capaciousness of the buildings.

The foundry has two Cranes, capable of lifting fifty tons each, and three others of thirty tons lifting power, by which any object may be transferred from one extremity to the other, or to any point on the floor. Two fifty-inch Cupolas are used for melting the iron, and are supplied by a pair of Blast Cylinders forty inches in diameter, and three-feet stroke. Twenty-five tons of metal can be melted in three hours. The Ovens for drying the Cores are of immense size and capacity.

In the Smith Shop, the blast is obtained by an Alden Fan. There are two Nasmyth Steam Hammers, one of ten hundred-weight and one of five hundred-weight of ram. There are also in this shop Bolt and Rivet Machines, for the manufacture of these articles, large numbers of which are annually used. The Brass Foundry has a Cupola and four Crucible Furnaces.

The lower Machine shop has a Boring Mill which will bore a cylinder eleven feet in diameter, and fourteen feet high; a Planing Machine, believed to be the largest in the world, capable of planing eight feet wide, fifteen feet deep, and thirty feet long, besides other lathes and planers, of various dimensions and power; two Slotters, Drill Presses, etc., etc. The upper Machine Shop is well stocked with Smaller Lathes, Planers, Shaping and Drilling Machines, Vices, etc. The Boiler Shop is provided with a Riveting Machine capable of riveting a boiler forty feet long, and of any diameter; with a Treble Punching Machine of immense strength; with heavy and light Shears and Punches; an Air Furnace, for heating large plates; Rolls, for bending; Cranes, etc. The largest Erecting Shed, used for putting up sugar apparatus, has a traveling Crane extending its whole length. The business of making Sugar Apparatus forms a large item in the productions of this establishment; and for a list of some of the extraordinary machines that have been constructed here, we must refer the reader to the work on *Philadelphia and its Manufactures*, to which we are principally indebted for these facts. Ordinarily, from three hundred and fifty to five hundred hands receive constant employment at these works.

William Sellers & Co.'s Machine Tool Works.

In the manufacture of Machine Tools, Philadelphia has a peculiar and deserved celebrity. Iron being comparatively cheap, by reason of proximity to the sources of its production, the Philadelphia builders use it freely in the beds and other important parts of their tools, which are consequently remarkable for solidity and freedom from injurious vibration when in active use. The weight of metal, however, is not so much their distinguishing characteristic as the excellence of the workmanship. Any one who will visit the establishment of William Sellers & Co., cannot fail to be astonished at the extreme pains taken to insure accuracy in all parts of the machines which they make. The wearing surfaces are *scraped* together—a slow and laborious process, which, however, secures absolute contact at every point. The bolt-holes are all reamed, and the bolts turned and driven home. The gearing is cut to a perfect form of tooth in every case. All the parts are made to standard guages, whereby each will fit its corresponding part in a hundred tools.

The firm which we have named has attained a reputation that is truly enviable. We know of no other that in so short a period of time has built up a mechanical reputation so wide-spread, resting on a basis of unquestioned substantial excellence. In 1848, the firm of Bancroft & Sellers commenced business in Philadelphia, and in a very few years their influence was felt in all branches of the machine manufacture. Tools from their shop were ordered from Russia, and supplied to other parts of Europe. Early in 1855, Mr. Bancroft died. Since his decease, the firm has been composed of two brothers, William and John Sellers, Jr., names that at this time are everywhere regarded as a sufficient guarantee of the excellence of whatever they manufacture. In workmanship, mathematical, not proximate accuracy, is their standard. A variation of a hair's breadth, if it can be overcome, is not left unremedied.

Besides Machinists' Tools, this firm manufactures a number of special articles which are in extensive demand. The *Self-adjusting Hanger*, made by them, is of great value in the construction of shafting, inasmuch as it allows the shaft complete control of the bearing, so as to insure an equal amount of pressure on every part. By means of this, they are enabled to use a long bearing without danger of binding the shaft, thus reducing the pressure per square inch upon the bearing, and consequently requiring less oil, as the pressure does not force out the oil so as to bring the surfaces of iron in contact and cause them to heat and cut.

About six years ago, the firm introduced a new plan of coupling shafting together, which obviated entirely the necessity, before existing, of fitting each shaft to its proper coupling, and also enabled them to adopt a new style of hanger, of much cheaper construction than any in use, the whole completing a system at present unequaled, all parts being interchangeable. The ability to interchange the parts in any system of construction is a matter that manufacturers can fully appreciate; but in shafting, it not only greatly facilitates its first introduction, but it enables any subsequent alterations or repairs to be readily made, and, what is of prime consequence, reduces its first cost whilst it improves the article.

They also manufacture a Turn-Table, for turning an engine and tender, of which the largest size is fifty-four feet in diameter, and weighs 32,000 lbs. It consists of a quadrangular centre-piece or box, upon which the arms for carrying the rails are keyed in a very substantial manner. At the outer end of the arms are placed two cross-girts, carrying four truck wheels, which are intended to take the weight when the load is going on or off. The centre rests upon *Parry's Patent Anti-Friction Box*, and the power of one man is sufficient to turn the table and its load easily, without the intervention of any gearing. They are so constructed that water in the pit, within eighteen inches of the top of the rail on the road, will not impair their efficiency or durability. Twenty-five of these Turn-Tables are now in use on the Pennsylvania Central Railroad, and the orders for them require the firm to complete one in every four days.

Some three years ago, Messrs. Sellers & Co. introduced *Giffard's Patent Self-acting Water Injector, for feeding boilers*, of which they are now sole manufacturers and licensees. This is an apparatus which is intended to dispense with pumps in feeding boilers and the various movements for working them in all classes of engines. It is an adjunct to the boiler, and entirely independent of the engine, and its application is rendered especially easy by the fact that it can be placed in any position, vertical, horizontal, or otherwise, and near to, or at a distance from the boiler, and at any reasonable height above the line of the feed water. This Injector will supply itself from the hot well of a condensing engine, and is connected with the boiler by two pipes, one leading from the steam space, and the other conducted to the lowest convenient point of the water space. By using this apparatus, those having boilers save not only the first cost of all pumps and the parts to connect them with the engine and boiler, but the power required to work them, and their wear and tear, which in high-pressure engines is very considerable. Since their introduction, and the improvements which they have made upon them, this firm have sold more than three thousand, and we believe with entire satisfaction to the purchasers. They have now forty hands constantly employed in manufacturing them, and their orders are at the present time fully up to their capacity for producing them.*

This firm are now manufacturing the Morrison Steam Hammer in this country. It is largely in use in England, being manufactured at New-Castle-upon-Tyne, by Messrs. Robert Morrison & Co. These machines differ principally from other Steam Hammers in having the piston-rod and piston forged in one solid mass, and of a size sufficient to give the required weight; the rod or hammer bar passes through both ends of the steam cylinder, which forms the only guides; the space underneath the cylinder is thus entirely clear, giving great facility for handling the iron.

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* As this work will probably be perused by a large number of manufacturers, and others who have boilers and steam engines, we probably cannot do our readers a greater practical service than in calling their attention to this valuable improvement. The General Superintendent of the Pennsylvania Central Railroad, Mr. Enoch Lewis, writes: "We have a large number of Giffard's Injectors upon our stationary and locomotive engines, and they continue to give us entire satisfaction. Upon all the new engines built for us during the past year, and upon those being built for us at this time, we are using them to the entire exclusion of pumps. Wherever pumps require renewal, we use Injectors in place of them. We find them less liable to derangement than pumps, and at least equally efficient."

Robert Rennie, proprietor of the Lodi Print Works, Bergen county, N. J., certifies: "The Giffard Injector has now been in use on one set of my boilers for nearly two months. It is a perfect success, and, although I have some of the best known steam pumps on my other boilers, I intend to take them all out, and supply their places with Injectors. They are the most perfect boiler feeder ever invented, and a blessing to any one that has as many boilers as I have."

Isaac Hinckley, Superintendent of the Merrimack Manufacturing Corporation at Lowell, writes: "The No. 6 Giffard Injector, which we received in November last, has never failed to perform its duty perfectly. It takes feed water at about 125° Fahr't, from a tank placed about thirty inches below the water line of the boilers; and feeds in the most satisfactory manner a boiler of seven feet diameter and twenty-five feet long, and carrying steam at about twenty-four pounds. The second Injector of the same size, lately received, is also in successful operation, feeding a nest of boilers, where steam is carried at forty pounds. We shall want in April three more Injectors; and I now see no reason to doubt that this Company will eventually apply this apparatus to their whole system of boilers, which is of an extent to require nine thousand tons of coal per annum."

Garsed & Brother, proprietors of the Wingohocking Mills, write: "We have used no Force Pump since the Injector was put up. The average pressure of our steam is eighty pounds; and we are so well satisfied with it that we would not be without it for double its cost."

G. Dawson Coleman, proprietor of the Lebanon Furnaces, writes: "No one, after seeing the operation of the Injector, can hesitate as to which to adopt when ordering a new engine; and most persons would decide to abandon the pumps on an old one. They are particularly valuable at blast furnaces, where we have so little time for repairs."

The celebrated Armstrong guns have all been forged under this hammer, and the English firm are just completing an immense machine of this kind. The weight of the hammer bar, which has just been completely finished, is 40 tons, its fall 13 feet, having a piston of 78 inches diameter forged solid upon it, the bar itself being 26 inches in diameter, and 38 feet long. This is the largest forging ever made.

These hammers are of two kinds; in one the valve is worked by hand, and may be either single or double acting, that is, the steam may be admitted to the under side of the piston only, or by a slight additional movement to the same valve, can be admitted upon the upper side also; in the other, the valve is under the control of the hammer itself, which enables the workman to obtain very rapid blows, the intensity of which are entirely under his control.

The works of Wm. Sellers & Co. are located at Sixteenth and Hamilton streets, and consist of a machine shop 320 by 83 feet, and a new three-story fire-proof building 110 by 55 feet, for the storage of finished work and patterns. This latter building contains their offices, drawing rooms, etc. Adjoining the above, the firm have two foundries, in one of which the moulding floor is 80 feet square, and is entirely devoted to heavy castings; in the other, the moulding floor is 80 by 40, with a wing of 80 by 20, all of which are devoted to the lighter class of work. Beside the above are the requisite buildings for pattern shops, smithy, and brass foundry. The engine and boiler for driving these works are located in smaller buildings, distinct from the main ones, so as to make the whole as nearly fire-proof as possible.

The future of American progress in the arts and manufactures depends largely upon the perfection of the tools with which her machines are made; and it is a source of National pride and congratulation that such a great degree of excellence has been attained, and that the general standard of manufacturing is so far advanced as to maintain a demand for such a superior class of machinery.

William H. Horstmann & Sons' Manufactory.

Is the oldest and principal establishment in Philadelphia for the manufacture of Ribbons, Military Trimmings, and Narrow Textile Fabrics. It is one that adds to the manufacturing importance, not only of the city in which it is located, but of the country. Its productions rival in elegance and substantial excellence those of France and Switzerland, and are sold by importing houses indiscriminately with their foreign importations.

The founder of this house, Mr. William H. Horstmann, was educated in the workshops of Europe, under the old system which demanded the production of a masterpiece of workmanship before an apprentice could receive a license to practice his trade as a master workman. He was a native of Germany, but came to this country in early manhood, and in 1815 commenced in Philadelphia the manufacture of trimmings. At that time there were but two patterns of coach lace made in this country, which were called after the Presidents, Jefferson and Monroe. Naturally ingenious, Mr. Horstmann set about enlarging the scope of the pursuit in which he had embarked, and to him probably more than to any other man, the business is indebted for its present perfection in this country. In 1824, he introduced from Germany the Plaiting or Braiding Machines, and in the succeeding year the Jacquard machines. Gold laces were made by power in Philadelphia, several years before it was attempted in Europe, and the use of power for making fringes may be said to have been first generally adopted here. In fact, we believe this firm was the first in any country to apply power to the general manufacture. Since the decease of Mr. Horstmann, the business has been conducted by his sons, and with what ability they have discharged the trust committed to them is evidenced in the present importance of their establishment. They have made several important inventions, as we have elsewhere mentioned, and their list of manufactures embraces a wide circle of fabrics of silk, silk and worsted, mohair, cotton, gold and silver thread, including some descriptions not made elsewhere in this country, besides every variety of military trimmings, not excepting swords, drums, and metal ornaments. Silk ribbons are made here, which are equal in all respects, not only in brilliancy of coloring and weight of material, but in evenness of manufacture to those of the looms of Lyons and St. Etienne. The English Commissioners to the World's Fair referred in their Report on the Industry of the United States to this establishment as presenting an example of system and neatness rarely found in manufactories in which handicrafts so varied are carried on.

The manufactory is situated at the corner of Fifth and Cherry streets, formerly the burying ground of the German Lutherans, and bought of the congregation owning the old church (built 1743) on the opposite side of Cherry street. The building forms an L, having a front of one hundred and forty feet on Fifth street, one hundred feet on Cherry street, and fifty feet wide, containing six floors. The engine house and machine shops are in a detached building in the yard. The machinery in operation in the factory is new, much of it original, and includes 130 Coach Lace Power Looms, 100 Power Looms, making 550 stripes, or rows of goods, 336 Silk Spindles, and other complete silk machinery, 400 Plaiting or Braiding Machines, 50 hand Looms, using over 160 Jacquard machines, ranging from 40 to 800 needles; besides all the auxiliary machinery necessary in the business.

Adjoining the manufactory on Cherry street, the firm own an additional lot, bought of the Friends, having a front of seventy-five feet on that street. The building on this, formerly a Meeting house, they have converted into a salesroom.

In 1857, Messrs. Horstmann purchased the entire stock, materials, looms, and patent rights of the Clinton Company, of Clinton, Mass., who were the largest manufacturers of coach lace in America. The designs of the best qualities of the laces, in which silk is freely used, are unsurpassed.

Since the commencement of the present rebellion, the Military Depot connected with this manufactory has been a general and most popular resort of the volunteers of the Federal army, especially officers, who have there been able to find every article necessary to equip them for active service or holiday display. The immense manufacturing facilities of the firm enabled them to meet promptly a sudden and pressing demand and supply a national want.

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Cornelius & Baker's Chandelier Manufactory

Is another that is confessedly without a superior in Europe or America. It has done as much certainly as any other for the higher development of art in our manufactures. It has enriched and adorned thousands of private and public buildings with masterpieces of beauty, whose influence has been felt throughout society, and aided in awakening a taste for objects of art. The pioneer establishment in the manufacture of Lamps and Chandeliers, it is the parent of other promising concerns that are working for the same end, and educating the people to a higher appreciation of the beautiful.

The origin of this establishment dates back nearly to the commencement of the present century. It was then a small workshop, employing two or three journeymen; now it is an immense factory, requiring as its motive power several hundred workmen, and two large steam engines. The operations are in fact conducted in two extensive buildings located in different parts of the city, but they are so managed in order and system as to constitute but one factory. A telegraphic wire, laid principally on poles erected at the expense of the firm, forms a medium for instantaneous communication between the two; and the state of forwardness of any work can be ascertained with almost as much facility as if it were in different parts of the same building. The Cherry street factory is an immense structure, five stories high, built in the form of a hollow square, and is entirely fire-proof. The floors are of brick; the stairs and window-sashes of iron, and the roof of slate and iron—not a pound of nails nor a particle of wood having been used in its construction. Each distinct process has its room or department, and every grade of workmen, from the common laborer to the artist and chemist, is needed in the various departments. In this miniature world, too, almost every nationality on the globe is represented

To describe the processes necessary in the manufacture of the lamps, chandeliers, and gas fixtures, as conducted in this establishment, would require more space than we can appropriate to the subject. Briefly, however, we may state, that the successive processes in the formation of an ornamental article from brass occur in the following order: The design is first *modeled* in a mass of prepared wax. Each modeler in the establishment mentioned has a private room, and every facility given him in the production of his patterns. Immense sums have been expended by this firm in procuring appropriate designs; and probably no other house in the world possesses such a rare collection. When the pattern, which is frequently the work of weeks, is finally completed, it goes into the hands of the caster, who makes a mould of it in brass, which is sent to the "chaser," and finally finished and elaborated into the dignity of a standard pattern, from which the caster may multiply an infinity of copies. It is one of the advantages which Philadelphia has for the manufacture of Ornamental Brasswork, that the sand found in the vicinity of the city is of so fine a character as to require no sifting for use, and the finest castings are easily made without the intervention of white metal. Thus, the shrinkage and variation of size between the white metal pattern and the brass casting, often found to exist in castings made from the former is avoided, and the register of the two sides of a branch, or other portion of a Chandelier or Gas bracket requiring to be fitted together, is more perfect than it otherwise would be. The brass pattern, too, takes a sharper and more decisive chasing than white metal; and all that is required to be done, after the castings leave the foundry is to file off the very small amount of superfluous metal retained in the casting, and fit the parts together.

The articles, after leaving the filing room, in which about one hundred men are employed, are sent to the *dipping* rooms, where, by means of acids and various chemical ordeals, a rich, pale gold color is imparted to the brass.

In the dipping process, as pursued in these works, great modifications are made in the character and strength of the acids used. It was found that, from the variation of temperature at Philadelphia, ranging as it does, from below zero in the winter, to 96° and 98° in the shade in the summer, nitric acid became unmanageable during the hot season, as its fumes were given off so rapidly as to injure the health of the workmen. The accurate scientific knowledge, however, brought to bear upon this point—one, too, involving the very existence of the trade, except at a frightful destruction to human health and life—has obviated every difficulty, adapted the acids to the temperature, and the dipping department is comparatively free from noxious fumes, even under the highest of the above temperatures. The result is equally satisfactory as regards the color of the work when dipped, some novel effects being produced, and a singular purity of color obtained.

From the dipping rooms the articles are removed to the *burnishing* room, where a high polish is given to the prominent parts of the work by means of tools (which consist either of highly polished steel, or a very hard material called blood-stone) dipped freely into a cup of small beer. After the brass is burnished it is again cleansed by means of acids, and finally washed in hot water, the heat of which soon causes the work to dry; it is then thrown into a trough containing bookbinder's paper shavings, which complete the drying. The work is then ready for *lacquering*. The lacquering is of the utmost importance, and requires the lacquer to be scientifically made and skilfully applied to ensure a rich and lasting gold color unaffected by the action of the atmosphere. In this process the house to which we have referred has made considerable improvements. It was found that the lacquers made after the English formula lost color very quickly from the extremes of temperature already noted; and that during the months of July and August, when the dew-point of the barometer is reached in Philadelphia, the red-lacquered work always streaked in the direction of the marks of the spinning tool on the broad surface of metal. After a series of experiments, carried through several months, this firm succeeded in making a lacquer which is quite permanent under any variation of temperature.

As the work is usually made in numerous parts, the fitting of these constitutes an important branch in such an extensive establishment. One room is occupied entirely by a number of men who are constantly employed in fitting together such Gas-work as Chandeliers, Pendants, Brackets, etc.; another, Girandoles and Candelabras; and a third, the numerous class of Solar Lamps designed for standing upon the table or for being suspended from the ceiling or against the wall. From all these apartments the goods are taken to meet once more in the packing-room previous to bidding a final farewell to their birthplace, and starting for their port of destination, which often is Cuba, South America, the Canadas, and sometimes China and India.

Besides the rooms in which these leading processes are conducted, there are numerous others devoted to special purposes. Some of the ornamental work is painted in parti-colors to please fanciful tastes; some is bronzed with different shades, while other work is tastefully enameled or covered with a coating of fine gold. Each of these processes has its appropriate department. There are also rooms devoted to glass-cutting, grinding, and polishing, and rooms appropriated to the workers in artistic bronze; while others are occupied by those who are employed at *damask* work, in which the chief agents are lacquer and acids. In the prosecution of such an immense business there is necessarily a vast deal of turning of metals. Many hands are constantly employed cutting screws, a branch in which considerable care and skill are requisite. All the screws of the different classes that are turned out of this establishment are made of one size. If the branch of a chandelier exported by this house to China should find its way to Russia, it would fit exactly into any of the chandeliers in the Kremlin.

The success which has attended the operations of this firm is, no doubt, due in part to the natural advantages of Philadelphia for this manufacture; in part to the large capital which the firm control, enabling them to procure the most perfect machinery, as well as purchase raw materials on the most favorable terms; but especially would we ascribe it to the constant attention paid by the managing partners to the scientific principles of Metallurgy, Chemistry, and Mechanism.

Mr. Wallis, an accomplished Englishman, in his report on the Industry of the United States, does full justice to the scientific attainments of the members of this firm, and observes that "the system, order, and accuracy which prevail throughout the establishment is full evidence of the influence of a mind reaching as far beyond the ordinary traditions of the workshop and foundry in the scientific sense as in the practical result it goes beyond the mere dilettantism of speculative science *sans* application."

To mention the master-pieces which have gone forth from the establishment of Cornelius & Baker, and are now decorating halls and churches, public and private buildings, would extend our article to an unreasonable length. The apparatus which lights the Hall of Representatives at Washington was made by them, and also that of the Senate Chamber, which contain 2500 burners, but so arranged that all can be lighted instantaneously. All, or nearly all, the capitols of the different States contain specimens of their manufacture, and many of them are remarkable for their size and elegance. The chandeliers and brackets of the Capitol at Columbus, Ohio, contain among their embellishments statuettes of Prudence, Science, Commerce, Liberty, America, modeled and bronzed in the highest style of art. The chandelier of the Hall of Representatives at Nashville, Tennessee, is 15 feet in diameter, and appropriately decorated with the products of the State,—corn, cotton, tobacco plants, etc. The Gas fixtures in the Academies of Music in Philadelphia, Boston, and Brooklyn, were also made here. The chandeliers hanging in the auditoriums of the two first-mentioned are said to be the largest in the world, being 16 feet in diameter, and 25 long, and have 240 burners. The new theatres in Philadelphia, in Chestnut, Arch, and Walnut Streets, are lighted by chandeliers from this establishment.

The firm of Cornelius & Baker is now composed of Robert Cornelius and Isaac F. Baker, Wm. C. Baker, Robert C. and John C. Cornelius. They usually employ about 800 workmen.

J. B. Lippincott & Co.'s Book Manufactory.

BOOK PUBLISHING, as conducted by this firm, is essentially a manufacture. They take the raw material, as furnished by the author, and convert into a shape as different from the original as the golden vase from the miner's ore. Unlike the publishers of England, they print and bind on their own premises, as well as distribute their publications; and their operations are conducted on a scale compared with which those of most European booksellers dwindle into insignificance.

Within the present year (1863) Mr. Lippincott completed and now occupies a warehouse which we believe is the most extensive and splendid edifice devoted to the sale of books in the world. It is erected on a lot having a front on Market St.—the principal business street of

Philadelphia—of forty-one feet, and extending back to Filbert,—a distance of *three hundred and fifty-six feet*. The front is of marble from the Henderson quarries near Norristown, five stories in height, each story having six windows with carved semicircular heads. In the basement, which constitutes an additional story, and in which are kept the school books and heavy stationery, all the packing is done. As an illustration of the extent of this firm's business, we may state that their bills for boxes, porterage, etc., exceed $10,000 per annum. The first floor is a magnificent salesroom, 40 feet front, 215 feet wide, and 16 feet high, divided by fifteen fluted iron columns, and containing over forty gas burners. The shelves, which cover both sides of the room, are faced with walnut, and filled with handsomely bound books upon every variety of subjects. In the rear of this magnificent saloon are the counting-houses. The second floor is appropriated to books and fine stationery, and the upper stories are used as a bindery of fine work.

In the centre of the building is an immense skylight,—the largest, it is believed, that has ever been constructed. A steam elevator affords a convenient means of communication for the transmission of packages and persons from the highest to the lowest story. On the lot fronting on Filbert Street it is proposed to erect a six-story brick building, 74 by 185 feet, to be entirely fireproof, and designed for a printing office and bindery, so that all the operations of the book manufacture and distribution can be carried on under one roof. The whole cost of the grand structure will be about $350,000.

At the present time the principal manufactory of the firm is in a building which they own at the corner of Fifth and Cresson Streets, where they have nine Adams presses in constant operation, and all the appliances requisite to constitute a first-class establishment.

The firm of which we are writing is composed of J. B. Lippincott, Edmund Claxton, George Remson, C. C. Haffelfinger, and John A. Remsen, all of whom have been connected with the house for many years. The success of Mr. Lippincott in the book trade has been remarkable from the beginning,—almost as remarkable as the rise of the Rothschilds in banking. Commencing without special advantages, he in a few years acquired sufficient to justify anticipations of an early retirement from active business, when, in 1849, he purchased the stock of Messrs. Grigg & Elliott, which was probably the heaviest purchase ever made by an individual in the book trade. The firm have now in their vaults the stereotype plates of nearly 300 different works, some of them very costly, as will be inferred when we state that the original cost of four of their publications, including their illustrated edition of the Waverley Novels and their Comprehensive Commentary, was $186,800. The business of the firm, however, is by no means confined to the books which they publish, but they are very large purchasers and sellers of others' publications. With the trade in the Middle States and the West the house is exceedingly popular, their list of customers before the present rebellion being nearly five thousand. Charging only a moderate profit on every thing they sell, they never offer leading articles below cost, or, as it is technically called, offer "baits to catch customers."

Within the last few years this firm have been largely engaged in the manufacture of Photographic Albums. As many as two hundred persons have been employed by them in this branch alone. They were among the first to engage in the manufacture of these Albums, and made important improvements, which facilitated their introduction and contributed to their popularity. The firm employs some thirty clerks, and about 500 persons in the different departments.

The Wissahickon Paper Mills.—Charles Magarge & Co., Proprietors.

THE manufacture of books naturally suggests that of paper; and in selecting a representative of this class of Philadelphia manufactories our attention would probably be directed by every one acquainted with the quality of their products to the Wissahickon Paper Mills, of which Charles Magarge & Co. are proprietors.

In 1845, Mr. Magarge, then, as now, extensively engaged in the sale of paper on commission, finding himself unable to fill orders for paper of unusual sizes, determined to supply this want, and purchased a plain, substantial structure 175 by 50 feet, situated on the Wissahickon Creek, and converted it into a Paper Mill. The motive power is supplied by water from the stream, having a head and fall of 16 feet; but as a precaution against any deficiency that might arise from low water, there is in the mill a 50 horse power engine, and another of 10 horse power for the minor machinery. This mill contains one large washing and two beating engines, and requires for its supply about 4000 lbs. of rags per day, and produces about 3000 lbs. of first-class paper.

In 1858 Mr. Magarge built at an expense of about $80,000 a much larger mill, adjoining the old one, and supplied it with all the appliances of a first-class Fourdrinier Mill. The main building is 78 feet 6 inches long by 54 feet deep, two stories high and attic, with a rotary boiler house, connected as a wing, 26 feet by 15 feet, 6 inches, a machine room 110 feet by 28, with a wing on the rear, 28 by 15, an engine room 17 feet long by 40 deep, a boiler house 40 by 25 feet, and chimney 100 feet high, 10 feet at base, and 5 feet at top. The Fourdrinier Paper machine is 72 feet long and 62 inches wide, and supplied with three 36-inch diameter iron dryers, and ten 8-inch-diameter copper dryers, and two sets of calender rods. There are three washing and five beating engines of large capacity. The machinery is propelled by a Corliss engine of 80 horse power, and the mill is supplied with pure spring water by means of costly reservoirs on the hills adjacent, from which the water is conducted into the vats by 1200 feet of 8-inch pipe and 900 feet of 6-inch pipe. Some of the reservoirs are 50 feet higher than the factory. The weekly consumption of rags in this mill is about 33,000 lbs., and the production about 24,000 lbs. of paper. The expenses per week of these two mills for raw material and labor are about five thousand dollars.

The warehouse of this firm is located on the corner of Sixth and Jayne Streets, and was built by Mr. Magarge in 1855. It is five stories in height, has a front of 50 feet on Sixth Street, and extends back 66 feet. The first story is of brown stone, and the remainder of the building is of pressed brick. The walls are no less than 20 inches thick.

The partners in the firm are Charles Magarge and William Bargh, who in an extended business career have attained a high mercantile reputation. "Like some tall palm, the noiseless fabric grew."

Benjamin Bullock's Sons' Army Cloth Factories.

PENNSYLVANIA has within her limits more woolen manufactories than any other State in the Union, and, with the exception of Massachusetts, is the largest producer of woolen goods. The mills, however, are generally small, for 447 establishments in Pennsylvania produced in 1860 only $12,744,372, while 131 factories in Massachusetts yielded a value of $18,930,000. One half of the woolen mills in the State were located in Philadelphia, which made yarn, hosiery, carpets, and mixed fabrics to the value of $8,909,019. Since the outbreak of the rebellion, however, and the consequent demand for army cloths, there have been important additions to the aggregate value of the annual product, if not to the number of the mills. One firm alone has 14 mills in constant operation, employs 3000 hands, furnishes subsistence to probably 10,000 persons, and, during the present year, will make cloths to an amount exceeding in value the product of all the mills in the city of Philadelphia in 1860. The firm alluded to is that of BENJAMIN BULLOCK'S SONS, who are certainly entitled to rank among manufacturers of the first class, whether measured by the English or American standard, and whose operations are on a scale so extensive, and exceptional in this country at least that they deserve to be commemorated in a history of the Remarkable Manufactories of America.

The founder of this house, Mr. Benjamin Bullock, was born at Yeadon, near Bradford, in England, in the year 1796. Apprenticed with a grocer in Bradford, he discharged his duties so faithfully that his employer left him a legacy of twenty pounds, which sum he used to pay the expenses of emigration to the United States. Arriving here at the age of nineteen, he commenced his career of industry in this country as a wool comber in the establishment of Henry Korn, then a weaver of woolen laces and fringes, and a manufacturer of military goods. In 1822, having accumulated some capital, he associated himself with Anthony Davis, under the firm style of Bullock & Davis, and commenced the business of wool pulling on Front Street, above Poplar. In the succeeding year he removed to the store 32 N. Third Street, where he remained for a period of nearly thirty-seven years. The first consignment of wool ever made from west of the Alleghanies was sent, it is said, to this house, and consisted of a lot of three hundred pounds. The entire sales, however, during the first year of their business did not exceed five thousand pounds, which, contrasted with the fact that his successors, the present firm, have during the eight months of the present year (1863) received, used, and sold, five million pounds, shows in a striking manner how vastly the traffic in wool has increased.

Perceiving a favorable opportunity to embark in manufacturing woolen goods, Mr. Bullock, in 1837, commenced the business in the "Spruce Street Factory," now owned by Mr. William Devine, who was then foreman at this mill. Subsequently, he purchased the "Franklin Mill," on Haydock Street, near Front, and at a later period bought the property of Bethuel Moore, near Conshohocken, which, as has been previously stated, was, it is believed, the first woolen mill started in the State of Pennsylvania, and probably the first supplied with woolen machinery from Jenk's works, then located at Holmesburg. His operations, compared with those of the present firm, were limited; but he laid broad and deep the foundations of commercial integrity upon which his successors have built, and on the fourth of June, 1859, ceased from his labors, leaving to his sons, who continue the business, a handsome capital and the more precious legacy of a good name.

When it became manifest that the Government of the United States would be involved in war to maintain its integrity, and the demand for army clothing became pressing, the firm of Bullock's Sons was among the first to provide the requisite means for supplying the nation's wants in this particular; and to this end, enlarged and rebuilt the mill at Conshohocken above referred to, and fitted it with new and improved machinery. It is now a structure 285 feet long by 85 feet wide, and contains ten full sets of machinery for making cloth. Attached to the main building are the dye-house, wool-house, fulling-room, engine-room, and building containing the apparatus for making gas from crude petroleum, which is supplied not only to the factory, but to the dwellings of the workmen in its vicinity. In addition, the firm have built around the mill a small town of neat and convenient dwellings, including a church, and having a fine macadamized road as its main avenue, and a park with walks and flower-beds, and central fountain as its ornament. That the operatives in this factory appreciate the liberality of their employers and the efforts made to promote their comfort and well being, was evidenced recently in a very flattering and public manner by their presenting on February 1, 1863, to George Bullock, the principal manager, a service of the purest silver, lined with gold, consisting of a pitcher 22 inches in height, a salver, goblets, and other articles, duplicates of those which received the prize at the late International Exhibition held in Paris, weighing 400 ounces, and purchased at a cost of one thousand dollars.

The motive power that propels the machinery is derived mainly from an engine of 100 horse-power, though additional power is obtained from the stream on which the mill is located. The raw material used is American wool, which, from the length of its staple, is peculiarly well adapted to cassimeres and other woolens known as "stuffs." The description of goods made in this mill is blue or army kerseys, of which they turn out from 8000 to 9000 yards per week. The operations of manufacturing are not dissimilar from those pursued in other factories, and need no detailed description. The wool is first cleaned or sorted, then scoured to remove the grease, when it is fit for the dye-vats, in which a day is sufficient to give the required color. From the dye-house the wool goes to the picking and carding room, where it is separated and prepared for the spinning-jenny, which converts it into threads of sufficient fineness for the weaving machines, which first give it the appearance of cloth, though not in a form which would be likely to pass the scrutiny of the Arsenal inspectors. When it leaves the loom it is 80 inches wide, and full of sieve-like interstices. Another process is required to give it the requisite "body," which is supplied by the fulling machine, where, under the action of a vapor bath, the 80 inches are contracted to 55 inches. The cloth is now ready for the "nap," which is raised by a peculiar kind of imported burr, although the same object can be effected by other means. It is then rolled or rasped, to remove the superfluous nap, folded with sheets of stout paper between each fold, and subjected to the action of a powerful hydraulic press, with hot plates, which give it the requisite gloss and finish. It is now ready for packing and transportation, the market having been secured by orders in advance. Finer goods for army wear than those made by this firm, judging from specimens in the office of Col. Crosman, Assistant Quartermaster-general at Philadelphia, are not produced in this country or in Europe.

Besides the Conshohocken Mills, they have thirteen other factories employed in making blankets, kerseys, etc. Since the commencement of the present war, this firm have furnished the United States three millions of yards of kerseys, several hundred thousand blankets, and nearly a half million yards of blue cloths. Had their facilities been less extensive, it is probable that large sums of gold would have been sent to foreign countries to purchase these articles.

The firm of Benjamin Bullock's Sons is composed of five brothers, Joseph W., George, Benjamin, Wm. B. and James M. Bullock. In bidding for Government contracts it has been their practice to add only a minimum profit to the actual cost of manufacturing; and if the difference between their bids and those of other firms can be called a reduction, they have saved the Government hundreds of thousands of dollars. It has been their policy also to sustain the financial credit of the Government. No quartermaster's certificates have ever been pressed by them for sale, while their own obligations have always been met promptly when due. Patriotism and commercial integrity are not often so prominently combined in firms whose principal customer is the Government.

It may reasonably be expected that when the clash of arms is over, Messrs. Bullock's Sons will direct their attention and facilities to improving the manufacture and elevating the standard of American broadcloths.

Wilson, Childs & Co., Army and Farm Wagon Manufactory.

This is another establishment that at the present time may be said to be of national importance. Wagons suited to the transportation of army baggage and supplies are scarcely less essential to the success of warlike operations than rifled muskets and Parrott guns, and this firm have the facilities for making one hundred and fifty of such wagons per week, or six hundred per month. They are, we believe, the oldest manufacturers of army wagons now established in this country.

In 1829, D. G. Wilson and J. Childs, the former a wheelwright and the latter a blacksmith, formed a partnership for making farm wagons, carts, etc., and by industry and prompt attention to business, they built up one of the largest manufactories of the kind in the United States. Mr. Wilson, now deceased, was a man of fine personal presence and discriminating intellect, and that he possessed those qualities that inspire affection as well as respect, is evidenced by the fact, somewhat rare in partnerships, that his associates in business are now no less solicitous than his relatives to do honor to his memory. His interest in the firm is now represented by his son, William M. Wilson.

The first army wagon, made after the present improved pattern, was built by this firm. Colonel George H. Crosman, now Assistant Quartermaster General at Philadelphia, was the inventor, and he employed Messrs. Wilson & Childs to construct the model. Shortly after the close of the Mexican war, in which Colonel Crosman had participated, and was promoted for gallant conduct, he determined to devise, if possible, some fixed system in constructing army wagons, for the want of which enormous expense, confusion, and delay had been incurred. His attention was directed primarily to securing exact uniformity of construction in all the parts; and this may be said to be the leading peculiar feature of his invention. Every part of these wagons is now made with the same exactitude of dimensions as the gun carriage of a park of artillery. In addition, however, he secured other, though perhaps minor advantages. By means of the coach tongue arrangement of the jaws of the front hounds, and the heavy iron bracing of them, these carriages, though ordinarily intended to be drawn by six mules, can be converted into ox wagons by merely reversing the two iron plates at the mouth and throat of the hounds Every wagon, too, is provided with an equipment of staples, mortises, and iron rings in the lower frame pieces, and fore holsters, by which India rubber floats can be attached for the crossing of rivers without unloading, or when unloaded, the bodies of these wagons are so made as to be easily converted into boats capable of carrying fifteen or twenty persons across a river, by merely caulking the seams with a mixture of tallow or any suitable substance. The government adopted Colonel Crosman's design, and wagons made in accordance therewith have been used in transporting supplies to Utah, and to our extreme frontier, over the roughest roads, and through trackless deserts, for thousands of miles, without the breakage of any important part.

Messrs. Wilson, Childs & Co. have two large manufactories, one at the corner of St. John and Buttonwood streets, being the premises on which they commenced business in 1829, and the other on Second street and Lehigh Avenue. The old factory covers a lot having a front of

230 feet on Buttonwood Street, and 120 feet on St. John; and the new factory on the west side of Second Street is situated on a lot 500 feet by 273, containing over three acres, and consists of one brick wheel and body shop 100 by 46 feet, three stories high; one brick blacksmith shop 200 by 35 feet; a saw mill, engine house, and machine shop, 80 by 45 feet, three stories high; running gear shops 100 by 45 feet; paint shops, boiler house, office, stables, sheds, etc. These buildings are provided with all the requisite machinery for expeditious work, as will be inferred from the fact which we have stated, that they have the capacity, of making 150 army wagons per week. In the saw mill there are two upright and six circular saws; a machine for boring holes in the centre of the hub; another for boring holes for the spokes; four drills (self-feeding), for drilling iron. In other shops there are three planing machines, a mortising machine, four machines for turning spokes, and one for shaping the felloes, and finishing them complete, and a machine for boring hubs so as to put the boxes in properly, to ensure accuracy and a solid bearing. Hubs are turned in a lathe, and both ends sawed at once by circular saws. In the engine and machine shops, there are tools for turning the iron axles, cutting screws, and performing other necessary operations. The blacksmith's shop, a new brick building, has thirty-three fires, a machine for punching, for making bolts, rivets, and all the iron work of a wagon. It is high, thoroughly ventilated, and one of the best arranged shops of the kind in the city.

The Lumber yard of the firm occupies a square on the east side of Second Street, 500 by 248 feet, or nearly three acres. Here is kept at all times an immense stock of lumber, amounting at times to 2,000,000 feet of hard wood planks and boards, 30,000 hubs, and 500,000 spokes. These, before being used, are thoroughly seasoned from one to five years, the usual allowance being one year for every inch in thickness. The hubs are made chiefly from black locust trees, sawed into suitable lengths, and before being put away to season, the bark is removed, and a hole bored in the centre to facilitate the seasoning process. In the store-rooms, the firm also keeps a large stock of finished work, including cart and wagon bodies, and several thousands of wheels.

During the thirty-five years that Messrs. Wilson, Childs & Co. have been engaged in this manufacture, they have supplied the Southern and Western states with a large number of the very best farm and plantation wagons. Their sales of these in a single year have amounted to several hundreds of thousands of dollars. It is a satisfaction to add that a business so extensive has fallen into the hands of men of public spirit, liberality, and enlightened views.

Howell & Brothers' Paper Hangings Manufactory.

The progress which had been made in the manufacture of Paper Hangings, previous to the Revolution, was alluded to in the first volume of this history.

The first manufactory in Philadelphia of which we have any account was one established about 1790, by two Frenchmen, named Boulu and Charden, in association with John Carnes, formerly American consul to Lyons, in France. Shortly afterward Mr. William Poyntell embarked in the manufacture. The kind of paper made, however, was of common quality and unglazed; and it was not until the war of 1812 that a superior style of French designs began to be attempted. Glazed grounds were introduced about the year 1824, but the circumstance that contributed more than any other to its improvement, was the introduction of the Fourdrinier machine, of which the first made in the United States was in 1830, by Phelps & Spafford, of Windham, Conn.

About the year 1813, John B. Howell, who had come from London to the United States in 1793, and established a manufactory of Paper Hangings in Albany, New York, removed to Philadelphia and commenced the business in that city. The house which he thus founded is now that of Howell & Brothers, one of the largest in the United States, and, it is said, not exceeded by any in Europe. They have two manufactories, one located at Nineteenth and Spruce Streets, 396 feet by 80, four stories high, and a smaller one on Eleventh near Catharine Street. They make about 5000 tons of wall paper per annum, including a fair proportion of velvet, velvet and gold, and satin-surfaced papers.

In their manufactories may be seen all the latest modern processes for printing, and machinery for coating and glazing that a few years ago, at least, had not yet been adopted in the English factories. For making the more common descriptions of paper, they employ machines in which the pattern is cut upon a cylindrical block, the process being the same as cylinder printing of any other kind. For the finer descriptions they continue the old style of printing by blocks, in which the outlines of the various tints, having been laved upon a block made of pear-tree, mounted in pine, the blocks are pressed on the sieves of color, and then applied to the paper, each one following the other on the guide-marks left by the previous impression. The blocks have a strap at the back to receive the workman's hand, and they are pressed down upon the paper by a mallet driven by the foot. The paper is received from the mill in rolls of about 1200 yards long and from 20 to 40 inches wide. The first process is to cover the blank paper with a preparation of chalk which forms a basis upon which the colors rest. In the English factories this is effected by hand; in the best American manufactories it is accomplished by steam. The polishing or glazing which succeeds is also effected by a single machine, composed of a succession of cylinders, operated by steam. The patterns are mostly furnished by the Philadelphia Female School of Design, though the best designs emanating from the schools of France are frequently procured. This firm employ in their manufactories about 200 hands, one third of whom are females.

Messrs. Howell & Brothers have recently taken possession of one of the largest and what is generally regarded as the most elegant store in the city of Philadelphia. It is located at the southwest corner of Ninth and Chestnut Streets, and has a front of marble extending 33 feet on Chestnut Street, and a depth of 235 feet.

Remarkable Chemical Manufactories.

PHILADELPHIA contains some of the most extensive manufactories of Chemicals in the Union. The climate of Pennsylvania is peculiarly favorable for the production of some of the most important articles, and a capital of several millions of dollars is now invested in the manufacture. We condense from a reliable record the following account of the early manufactories which may now be said to be of national importance.[1]

John Harrison, of Philadelphia, was the first successful manufacturer of Oil of Vitriol in the United States. He had spent two years in Europe in acquainting himself, as far as he could gain access to them, with the processes used by the chemists, and after his return to America devoted himself to the manufacturing of Chemicals. How much earlier he succeeded we have no means of ascertaining; but in 1806 he was fully established as a manufacturer of oil of vitriol and other chemicals, in Green Street, above Third. His leaden chamber was a small one, and capable of making about forty-five thousand pounds or three hundred carboys of oil of vitriol per annum. So successful were these operations that in 1807 he had built a leaden chamber eighteen feet high and wide, and fifty feet long, capable of making three thousand five hundred carboys per annum. The price which the acid then brought was fifteen cents per pound.

John Harrison was the founder of the present well-known concern of Harrison Brothers & Co., whose chemical works in Kensington occupy

(1) Leading Pursuits, edited by Edwin T. Freedley.

the site of their father's old establishment. They manufacture extensively White and Red Lead and Litharge, White and Brown Sugar of Lead, Sulphuric Acid, Alum, Copperas, Pyroligneous acid, and the Carbonates of Ammonia. Their productions enjoy a high character for purity and genuineness.

Sulphuric acid cannot be concentrated in leaden vessels beyond a certain density, and for bringing it to the strength required in commerce, the only means then known was to boil it in large glass retorts to the standard weight. This was a precarious operation, and the losses sustained from breaking the glass and spilling the acid greatly increased the cost of the manufacture.

There lived at this time in Philadelphia a celebrated foreigner, Dr. Erick Bollman, who had distinguished himself by a gallant and all but successful attempt, in company with Francis K. Huger, of South Carolina, to rescue General LaFayette from his guards, during his imprisonment at Olmutz. Dr. Bollman was a Dane, a man of powerful and versatile mind, a physician, a chemist, a political economist, and a general scholar. Among other pursuits, he had turned his attention to the working of crude platinum, of which there was a considerable quantity in this country, and for which there was no demand. He had brought from France the method then lately discovered by Dr. Wollaston, for converting the crude grains into bars and sheets; and, in 1813, he had wrought it into masses, weighing upwards of two pounds, and into sheets more than thirteen inches square. One of the first uses to which he applied these sheets was the making of a platinum still for John Harrison, for the concentration of his oil of vitriol. This still weighed seven hundred ounces, and contained twenty-five gallons, and it continued in use for about fifteen years.

This early application of platinum to the concentration of sulphuric acid is highly creditable to the sagacity and ingenuity of the American manufacturer; for the use of platinum for this purpose was then a novelty in Europe, and had not been known for more than a year or two, and only to a few.

The next leaden chamber of which we have any account was put up by Farr & Kunzi. It was a small chamber, and they concentrated their acid in glass.

Charles Lennig was the first Philadelphian who entered largely into the manufacture of oil of vitriol, and put up extensive leaden chambers, concentrating the acid in platinum vessels so arranged as to be kept constantly at work while discharging a steady stream of concentrated acid. His works were in full operation in 1831, and they still continue so under the present firm of Nicholas Lennig & Co. at the new chemical establishment of this firm recently erected at Bridesburg, where they are largely engaged in this manufacture, as well as that of Soda Ash, Alum, Copperas, Aqua fortis, Nitric and Muriatic Acids, all the various preparations of Tin for the use of dyers, such as Tin Crystals, Oxymuriate of Tin, Pink Salt, etc. Besides the firms mentioned, those at present engaged in the manufacture of sulphuric acid, in and near Philadelphia, are Messrs. Powers & Weightman, at the Falls of Schuylkill; Savage & Stewart, and Moro Phillips, at Frankford; Potts & Klett, at Camden.

The war of 1812, and the commercial restrictions which preceded it, caused such a scarcity and dearness of chemicals that numbers attempted the preparation of the more prominent articles; and the complete establishment of the manufacturing business in this country dates from this period. Many of these works were undertaken by foreigners, who had learned something of chemical manipulations in the German, French, or English factories, or by capitalists among our own druggists, who made use of foreign skill, or pretensions to skill, in getting their works into operation. It was in this way that factories for the making of Prussian blue, Schule's green, and other pigments and chemicals, were from time to time started.

Many of the foreigners had been laborers in the laboratories abroad, who had no knowledge of chemistry as a science, and whose skill was confined to their own limited routine of work. There were others of a higher character, men of competent education as chemists, and of much intelligence. Of these, Dr. Gerard Troost was the most prominent. He was a Hollander, who had studied medicine and chemistry, and had been a favorite pupil in mineralogy of the celebrated Abbe Häuy. He was probably one of the best crystallographers of his day. He settled in Philadelphia, was one of the founders of the Academy of Natural Sciences, and was employed in several chemical enterprises. He superintended for a short time the laboratory of S. Wetherill & Son; was then engaged in chemical works with Lechleitner, the Swedish consul, and afterwards, about the year 1815, superintended an alum and copperas works on the Magothy River, on the eastern shore of Maryland. He did not possess the qualities of a practical manufacturer, and most of his enterprises were unsuccessful. He afterwards removed to New Harmony, with Owen, M'Clure and others; subsequently accepted a professorship in the University of Nashville, and became geologist to the State of Tennessee. Dr. Troost died in 1850.

Another of these intelligent foreigners was Abraham Kunzi. He was a Swiss, and had been educated as an apothecary, in a country where all the apprentices are taught pharmaceutic chemistry, and practised in making most of the officinal chemicals. He worked for some time with John Harrison, and then with S. Wetherill & Son. He soon entered into partnership with John Farr, a young Englishman, who had served in one of the best retail drug stores in London. The practical skill of Abraham Kunzi, the popular manners and mercantile enterprise and prudence of John Farr, and the fair dealing and integrity with which the business of Farr & Kunzi was conducted, rendered the firm eminently prosperous, while the circumstances of the times enabled them to lay the foundation of the most extensive chemical works in America.

The concern thus founded by Farr & Kunzi is now owned and conducted by their pupils and successors, the well known Messrs. Powers & Weightman, who have not only enlarged its extent, but, if possible, advanced its reputation. This firm is now among the largest general manufacturing chemists in the world. They have two establishments,—one at the Falls of Schuylkill, where they make, in addition to Oil of Vitriol, Aqua Fortis, Nitric and Muriatic Acids, Epsom Salts, Copperas, Blue Vitriol, Alum, and Alcohol, all on a large scale. At their establishment at the corner of Ninth and Parish streets, Philadelphia, they manufacture Sulphate of Quinine, which is their staple article, the Salts of Mercury and Iodine, Citric Acid, Tartaric Acid and its Salts, and all the officinal chemicals of the British and American pharmacopœias. The reputation of this house is unsurpassed for the purity and beauty of its chemicals, and for the fairness and liberality of its dealings. It is not saying too much to add, that few examples can be found of a chemical establishment which, for a course of forty years, has uniformly sustained so high a reputation in all these particulars.

The manufacture of White Lead was first commenced in the United States, as we stated in the preceding volume of this History, by Mr. Wetherill, of Philadelphia, during or before the Revolution. His grandsons, of the firm of Wetherill & Brother, continue the manufacture, and have a factory on the west side of the Schuylkill. They employ an engine of eighty-horse power, and consume daily about 18,000 pounds of pig lead. The most extensive manufacturers of this article in the city of Philadelphia, where there are now four factories, and among the largest in the country, are the firm of JOHN T. LEWIS & BROTHERS. The history of their connection with the manufacture is as follows.

In 1813, Joseph Richards established a White Lead factory on a lot on Pine Street between Schuylkill Seventh and Eighth Streets, and in the winter of 1819–20 sold it to Mordecai and Samuel N. Lewis. They put the works in repair at once, and made during the first year 100 tons of White Lead. The increase in the quantity produced was gradual, amounting in 1830 to 600 tons, and in 1840 to over 1000 tons. In 1827 they commenced the manufacture of Acetic Acid for their own use, in place of cider-vinegar; and in 1830, that of Linseed Oil. In 1849 the firm purchased from Rodman and Joseph Wharton a lot in Richmond, having a front of 620 feet on Duke Street and 360 on Huntington Street, on which there was a White Lead factory already in operation. The works were much enlarged, and in addition to White Lead, Linseed Oil, and Acetic Acid, they began the manufacture of Red Lead, Litharge, Orange Mineral and Sugar of Lead, and at a later day other paints. In August, 1856, the firm of M. & S. N. Lewis, which had continued unchanged for fifty years, was succeeded by that of John T. Lewis & Brothers. Their present factory, on the lot above mentioned, is very extensive, and they have a capital invested of about $350,000, employ 90 hands, and produce annually of White and Red Lead, Litharge, etc., about 4,500,000 pounds; other Paints 1,200,000 pounds; Linseed Oil about 60,000 gallons; and of Vinegar about 300,000 gallons.

In 1820 there were but three establishments in the United States making White Lead, and their aggregate product did not exceed 400 tons. Now, on the seaboard alone, excluding several factories in the West, there are twelve which make in the aggregate annually about 14,000 tons, or 28,000,000 of pounds. Since 1852, however, it is believed that there has not been any considerable increase in the quantity produced, or any important addition to the number of factories. In that year the White Oxide of Zinc was introduced, which has satisfied the increased demand for white paints to the extent of about 6000 tons annually. It sells for about one-third less than White Lead, and the production is only limited by the demand.

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Massey, Collins & Co.'s Ale Brewery.

The manufacture of Ale and Porter is an extensive business in Philadelphia, employing a capital of a million and a half of dollars. Though there are no Breweries which will compare in size with some in England, yet it has been said, by competent judges, that Philadelphia Ale, for wholesome qualities and palatableness, is much superior to that ordinarily made in London, as no other ingredients enter into its composition than malt, hops, and pure water.

The largest Brewery at the present time in Philadelphia is that of

Massey, Collins & Company, and the firm is regarded as a leading one throughout the whole country, both by reason of the extent of its business, and the superior quality of its manufactures. A description of the processes adopted by them will therefore fairly represent the mode of conducting the business in first-class American establishments.

Preparatory to the process of brewing, the barley is converted into malt. This firm have large malt houses attached to their Brewery capable of malting a hundred thousand bushels per annum. The grain is first steeped in water, contained in wooden or stone cisterns—the water being frequently drawn off and a fresh quantity supplied, to cleanse the grain. When sufficiently saturated to admit of its being crushed between the thumb and finger, it is then drained of the water, and spread over a cement floor to the depth of six or eight inches, and left, with occasional turning, until it sprouts. In the process of germination, a peculiar azotized substance is evolved, called diastase, which acts as a powerful agent in converting starch into dextrine, and ultimately into saccharine. The maltster continues to turn the barley, at intervals, so as to produce a uniform growth, upon the floors. When the barley has sufficiently sprouted—a stage determined by the sweet taste and the chalky appearance of the inside of the grain—it is dried rapidly, in order to retain the starchy matter, which in a long growth of the sprouts and rootlets would be wasted. This drying is done in kilns; here the heat destroys the germ of the grain, expels the moisture, and converts it into a sweet and friable grain called malt. It is then passed through a cylindrical sieve, separating it from the rootlets of the malt.

Brewing consists of six distinct processes, namely—mashing the malt or infusing it with hot water, boiling the malt with the hops, straining, cooling, fermenting with the addition of the yeast, and clearing. The mash tuns are large circular tubs with a double bottom, the uppermost of which is false and pierced with numerous holes: between the two there is a space of two or three inches, into which the stopcocks enter, for letting in the water and drawing off the wort: within the tub is fixed a peculiar rotary apparatus for agitating the crushed grain and water. From these tubs, after the starch has been converted into sugar, it is drained into boiling coppers, additional water being sprinkled upon the grain until the saccharine is extracted, which is ascertained by an instrument called the saccharometer. In the Brewery which we have mentioned the mash tuns are of sufficient capacity to infuse twelve hundred bushels of malt daily; and the boiling coppers are heated by means of steam pipes.

As soon as the wort is introduced into the coppers, the proper proportion of hops is added, and the two boiled together until the mixture becomes clear, about three hours being required for this operation. The boiling having been completed, the contents of the coppers are let down into the hop-back, which is a cistern with a metal bottom full of small holes which act as a strainer and separate the refuse hops from the wort. From the hop-back as rapidly as possible the liquor is drained into coolers, which are large shallow vessels, and there cooled by an apparatus called a refrigerator to the temperature—usually about sixty degrees—at which the brewer desires the fermentation to commence. When the worts have been cooled to the proper temperature they are discharged into the gyle, or fermenting tuns—which are large circular vats or tubs, bound with strong iron hoops, having in the centre pipes placed in a cylindrical form, called attemperators. Then the requisite quantity of yeast of a previous brewing is added and the fermentation commences. This process continues from three to five days, during which the temperature of the fermenting body rises, and a rapid disengagement of carbonic acid takes place. In Massey, Collins & Co.'s Brewery the fermenting tuns have the capacity of holding seventy-five thousand gallons. When the active fermentation is over, and to prevent acidity of the worts, it is racked off from the fermenting vats into puncheons of one hundred and twenty to one hundred and fifty gallons capacity, where it purges itself of the yeast, or in other words is cleansed and refined. From the puncheons the Ale is transferred into storing vats, or into casks ready for market. The firm which we have mentioned have vats capable of containing from two hundred to four hundred barrels each, and their cellars will hold ten thousand barrels of Ale and Porter.

The Brewery now owned by Massey, Collins & Co., was originally erected by farmers of Chester and Delaware Counties, Pennsylvania, and transferred by them to the Brewers' Association of Philadelphia. Subsequently M. L. Dawson, whose ancestors had been prominent brewers for a period of eighty years, purchased the establishment, which however was small compared with its present size. Poultney & Massey, the predecessors of the present firm, greatly enlarged the buildings in 1855, and the present owners have made important additions to their brewing facilities in order to meet the demand for their popular malt liquors. The buildings, as now erected, form a hollow square of one hundred and fifty feet each way, six hundred feet in all, seven stories in height, with extensive cellars and vaults underneath the whole eighteen feet in depth.

The firm also contemplate erecting on their property, adjoining their establishment on the west, a large malt house, with extensive cellars and sub-cellars underneath, which will communicate with their present vaults, thus furnishing double capacity for storage. This is rendered necessary for the maturing of the higher grades of Ales and Porters to which this firm are giving their special attention, and which are now sold and appreciated in all the markets of the United States—and large quantities are shipped annually to the West Indies and South America.

To attempt a detailed description, or a historical sketch, of all the noteworthy establishments in Philadelphia, that contains over six thousand manufactories—a city that is the centre of two hundred and sixty cotton and woolen factories, a fact in itself most remarkable, and not generally known—would require a separate and distinct folio volume. Besides the establishments in the iron manufacture which have been noticed, there are the Pascal Iron Works of Morris, Tasker & Co., the Industrial Works of Bement & Dougherty, the People's Works of Hunsworth, Eakins & Naylor, the Penn Steam-Engine and Boiler Works of Neafie & Levy, the Machine Works of Morgan, Orr & Co., Matthews & Moore, J. T. Sutton, Stanhope & Supplee, Thomas Wood, and George C. Howard; the Paper Folding Machine Manufactory of Chambers, Brother & Co., the Paper Machinery Manufactory of Nelson Gavit, the Ornamental Iron Works of Wood & Perot, the Galvanized Iron Works of McCullough & Co., the Scale manufactories of A. B. Davis & Co. and Abbott & Co., Phillips & Allen's Rivet Manufactory, Rowland & Co.'s Steel Works, the great Stove Works of Abbott & Noble, Leibrandt & McDowell, and North, Chase & North, the Hollow Ware Foundries of Stuart & Peterson and Savery & Co., the Bolt and Nut Manufactories of E. & P. Coleman and Hoopes & Townsend, Murphy & Allison's Car Works, the Saw Manufactories of Henry Disston, William Rowland & Co., Walter Cresson, J. W. Bringhurst & Co., and William Conway, the Safe Manufactories of Evans & Watson, and Farrel, Herring & Co., the Malleable Iron Works of E. Hall Ogden, the Carbine and Pistol Manufactory of Christian Sharps, the Shot Factory of Thomas Sparks, the Sword Manufactory of George W. Simons—and many others. In Brass, there are the works of J. & H. Jones, McCambridge, Fry & Co., Samuel Croft, Henry Belfield & Co., Samuel J. Creswell, Wiler & Moss, Jas. Yocom, Jr., and others. The long list of Marble Workers includes eight who have steam mills, namely, John Baird, Edwin Greble, Charles Heebner, Lewis Thompson & Co., William Struthers, J. E. & B. Schell, Eli Hess, and John V. Vanderbilt. Among the Sugar Refineries, there are several large establishments; as, for instance, those of J. S. Lovering & Co., Harrison, Newhall & Welsh, T. A. Newhall & Sons, and Taylor, Gillespie & Co. The manufacture of Gold and Silver Plate, and

Plated Wares, is carried on extensively in several establishments besides those of Bailey & Co., James E. Caldwell & Co., Garrett, Ladomus, Wilson, and Robbins; and the Assaying of Precious Metals, by Dreer & Sears, E. Tracy & Co., and others. The manufacture of Carpets is very creditably represented by such establishments as A. McCallum & Co., John Bromley & Sons, and James Lord, Jr.; and Oil Cloth, by Thomas Potter, George W. Blabon & Co., and James Carmichael. Then there are the Agricultural Implement manufactories of David Landreth & Son, William L. Boyer & Brother, and R. Buist & Son; the Fork Manufactory of Sheble & Fisher; the Shovel and Spade manufactories of T. Rowland & Sons and H. Griffiths & Co.; the Blacking Manufactory of James S. Mason & Co.; the Breweries of W. D. Smith & Co., George W. Gray, Newlin, Zell & Abbott, William Gaul, Leeds & Gray, Gustavus Bergner, Engel & Wolf, Bergdel & Psotta, and others; the Glue Manufactory of Baeder, Delaney & Adamson; the Cordage Factories of Weaver, Fitler & Co. and McIntyre & Schlichter; the Enamelled Collar Manufactory of the Lockwood Manufacturing Company; the Dental and Surgical Instrument Manufactories of Horatio G. Kern, Snowden & Brother, and J. H. Gemrig, and others; the extensive Umbrella Manufactories of Wright, Brothers & Co., William A. Drown & Co., Simon Heiter, and William H. Richardson; the Saddlery & Harness Manufactories of W. S. Hansell & Sons, E. P. Moyer & Brothers, M. Magee & Co., S. R. Phillips, and others; the Sewing-Silk Manufactories of B. Hooley & Son and Dumont & Aub; the Spice Mills of C. J. Fell & Brothers, Howard Worrell, and John R. Matlack & Co.; the Flour Mills of William B. Thomas & Co., Rowland & Ervien, Detwiler & Hartranft, Myers & Ervien, James Watts, and others; McCutcheon's Burr Millstone Manufactory; the Soap and Candle Works of G. Dallett & Co., E. Duffy & Son, the Elkingtons, Van Haagen & McKeone, and others; the Beef-Packing establishments of J. F. Alberger & Co. and N. H. Graham & Co.; the Playing Card Manufactory of Samuel Hart & Co.; the Tinware Manufactories of Isaac S. Williams, Charles Burnham, J. Hall Rohrman, Melloy & Smith, H. W. Butterworth, and others; the great Rectifying Establishments of John Gibson, Sons & Co., Kirkpatrick, DeHaven & Co., Freeman & Simpson, Rockafellow & Co., the Catherwoods—and others. Among the two hundred and sixty Cotton and Woolen Mills there are of course some large establishments, as, for instance, the Kennebeck and Penn Factories of William Divine & Son, the Mills of Thos. Drake, the Hosiery Manufactory of Martin Landenberger, the Dye Works of J. & W. Horrocks, the Wingohocking Mills of R. Garsed & Brother, the Mills of A. Campbell & Co.; the Gloucester

Print Works, of which David S. Brown, of Philadelphia, is President; and many others. But enough has been said to establish as a fact that, though it be true that a large proportion of the six thousand manufactories of Philadelphia are small concerns, yet it is also true that the city contains many large and some magnificent establishments. Those who are desirous of prosecuting a more exhaustive research will find aid in the work, before quoted, on the manufactures of Philadelphia.

One circumstance that has contributed to the rapid development of manufactures in Philadelphia, is the fact that the city is the centre of the principal iron production of the United States. According to the preliminary report of the Census of 1860, Pennsylvania made 62·5 per cent. of the pig iron produced in the United States, and more than one-half of the bar and other rolled iron. It may be proper, therefore, to notice in this place some of the large Iron works of the State, which, it is said by competent judges, surpass any similar works in England and Wales.

Probably the largest and most productive Furnaces in the United States are those of THE THOMAS IRON COMPANY, at Hockendauqua, Lehigh County, four miles above Allentown. They were built in 1855, and are managed by Samuel Thomas, the son of the gentleman who first successfully introduced the manufacture of Iron by means of anthracite coal. The original furnaces were built together, and alike, 18 feet across the bosh and sixty feet high, and are blown at the extraordinary pressure of 8½ lbs. to the square inch, by two large engines constructed at the West Point Iron Foundry, the steam cylinders being fifty-six inches in diameter, and the blowing cylinders ninety inches diameter. In 1862 and 1863 these twin stacks made 27,000 tons of Iron, a larger production than has ever before been attained. Recently two additional furnaces were erected, 18 by 55 feet, which are blown by two very large beam-engines constructed by I. P. Morris & Co., of Philadelphia, the steam cylinders being 66 inches in diameter, and the blowing cylinders 108 inches, and ten feet stroke. The materials are conveyed to the top of the stacks by atmospheric pressure—and in all their appointments they may be said to be the model furnaces of America.

Next to these, the most productive Furnaces are those of the LEHIGH CRANE COMPANY, situated about a mile below the Thomas Works, on the eastern side of the Lehigh River. These consist of five furnaces, the first stack having been built in 1840, the second in 1842, the third in 1846, and the remaining two in 1850. The first three are forty-seven feet high, but of different bosh widths, namely—eleven, thirteen, and sixteen feet. The last two are eighteen feet wide by fifty-five feet high, and are blown by four engines. The principal one, built by I. P. Morris

& Co., has a steam cylinder fifty-eight inches in diameter, and a blowing cylinder ninety-three inches, both ten feet stroke of piston. The beam of this engine works on a column of cast-iron thirty feet high, and the whole is set upon a heavy cast-iron bed plate. In 1862 these five furnaces made nearly 50,000 tons of anthracite iron. The President of the Company is Theodore Mitchell; the Treasurer, Frederick R. Backus; and the Secretary, Benjamin Leedom. The manager of the works is Mr. John Thomas, son of David Thomas, who is accredited with having been the first who introduced successfully the use of anthracite coal in the manufacture of iron. This was accomplished in Wales, in 1837; and in June, 1839, he superintended the blowing in the Pioneer Anthracite Furnace at Pottsville, the first of the kind in America.

Next to these are probably the furnaces of the **ALLENTOWN IRON COMPANY**, situated about a mile above Allentown—Joseph Cabot, President; Samuel Lewis, Manager. They consist of four stacks, two of them twelve feet wide, and two sixteen feet—while three of them are forty-five feet high, and the fourth fifty feet. Nos. 2 and 3 in 1862 made respectively 7856 and 9888 tons of Iron; and the total production of all, two of them being in blast only a few months, was 24,691 tons. These are probably the most picturesque works of the kind in the United States. An imaginative writer has described the pile "as rising unobstructed and unrivaled by surrounding sights—a world of stone and iron in the air—its summits crowned with tall chimneys, like the turrets of Caernarvon, flames issuing from its tunnel-heads, and cars traveling up and down its planes, long trains of ore mules passing to and fro across its lofty bridges, while other trains of railroad cars wait below to carry off the iron. The repose of bygone centuries seems to sit upon its immense walls, while the roaring energy of the present day fills it with a truer and better life than the revelry of Kenilworth or the chivalry of Heidelberg."

At Phillipsburg, N. J., opposite Easton, Penn., are the **COOPER ANTHRACITE STEAM FURNACES**, consisting of three stacks, being respectively 20 by 55, 18 by 42, and 22 by 55 feet. Here the first experiments in this country were made, in 1856, to test the availability of Bessemer's process for blowing cold air at a high pressure into molten cast-iron to produce malleable metal. The works are owned by the Trenton Iron Company, which has a paid-up capital of $1,000,000, the principal stockholders being Peter Cooper and Abram S. Hewitt, of New York. The pig iron is sent from the furnaces to South Trenton, where the Company have a rolling mill that has fifty-eight furnaces in all, and six trains of rolls, driven by steam, and producing about 14,000 tons of rails and wire annually. The area enclosed under one roof is three and a half acres, and is said to be the largest single building in the United States. Here were made the first wrought-iron beams for fire-proof buildings for the United States Government, and at these works the wire was made, a mile of which weighed but half a pound, that received the prize medal at the World's Fair in London. More recently the Company have succeeded in manufacturing Gun-barrel iron equal in quality to the foreign, and the market is now fully supplied. The discovery of the process of making this description of iron is perhaps of greater value and importance to the country than any other new manufacture introduced since the war commenced. Locomotive tyres are also successfully made at these works. The officers of the company are—Edward Cooper, President; T. Abbott, Vice President; Abram S. Hewitt, Secretary; James Hall, Treasurer; and Charles Hewitt, Manager.

At Danville, Montour County, are the PENNSYLVANIA IRON WORKS (formerly Montour), of Waterman & Beaver, which have cost upward of a million and a half of dollars. There are three blast furnaces, two of them 17 feet bosh, which make on an average 20,000 tons of iron per annum. The pressure of blast at the tuyeres is four and a half pounds per square inch. The company have also two rolling mills, that contain sixty-five puddling furnaces, fourteen heating furnaces, three trains of puddling rolls, one with five pair of rolls and two with two pair each; two rail trains with three high rolls, and which have a capacity to produce 30,000 tons of finished rails per annum. The landed estate of the Company, including the mineral lands, exceeds 3000 acres, with 300 tenement houses. The establishment was commenced in 1839, and in the fall of 1845 made the first railway iron that was manufactured in this or any other country by means of anthracite coal.

At Scranton, in Luzerne County, are the furnaces and rolling mill of the LACKAWANNA IRON AND COAL COMPANY—J. H. Scranton, President; D. S. Dodge, Treasurer; and Edward C. Lynde, Secretary. There are four furnaces, built respectively in 1849, 1852, and 1854, two of them being eighteen feet in the bosh, No. 3 nineteen feet, and No. 4 twenty feet—all of one common height, fifty feet. They are blown by four low-pressure beam-engines, two having steam cylinders 58 inches in diameter, and blowing cylinders 93 inches diameter, 10 feet stroke, built by I. P. Morris & Co. of Philadelphia, the steam being generated entirely by waste heat. Two of the furnaces, Nos. 3 and 4, are now in blast—the former of which made in ten months of 1862, 12,617 tons; and the latter made, in 1863, 14,877 tons, and in 20½ months of the present blast, 25,000 tons. The aggregate productive capacity of all these furnaces is about 50,000 tons a year. The rolling mills of the company comprise one main building 500 by 140 feet; two puddling mills, one 300 by 90, and one 150 by 90 feet; with 45 puddling furnaces, 15 heating furnaces, 6 trains of three high rolls, 1 seven-ton Nasmyth steam hammer, all driven by steam. The product in 1863 was 22,000 tons of finished iron.

The purchase of the present site of the town of Scranton was made by several of the members of the present Lackawanna Iron and Coal Company, in July, 1840. The place at that time consisted of five small dwellings, a saw mill, grist mill, school-house, and cooper shop. The foundations of the first blast furnace, now in ruins, were laid in September, 1840, and the buildings of the rolling mill were commenced in May, 1844. Attached to the works are about 7000 acres of coal and timber lands, from which 120,000 tons of coal were mined in 1863, and consumed almost entirely in the blast furnaces and iron mills.

At Phœnixville, Chester County, are the furnaces and rolling mills of the PHŒNIX IRON COMPANY—David Reeves, President; Samuel J. Reeves, Vice President and Treasurer; Robert B. Aertsen, Secretary; and George H. Sellers, Superintendent. There are three blast furnaces, two of them 12 feet across the boshes and 38 feet high, and the other 14 by 50 feet. The aggregate annual production is about 17,500 tons. The company have also three rolling mills, containing in all 28 heating furnaces and 50 puddling furnaces. The product of these mills in 1863 consisted of 10,470 tons of railroad iron, and 8,052 tons of bar iron, iron beams, wrought iron railway chairs, axles, and other-shaped iron. There are also connected with these works extensive machine shops and foundries, in which machinery, wrought iron guns, and iron bridge work, are manufactured and finished.

At Johnstown, Cambria County, Pennsylvania, are probably the largest rolling mills in the country. They are owned by the Cambria Iron Company (Charles S. Wood, President), and were formerly leased by WOOD, MORRELL & COMPANY, of Philadelphia. The principal mill was built in 1854, and, having been destroyed by fire in 1857, was rebuilt in the same year, in the form of a cross, 612 feet long one way and 372 feet the other. It has 30 double puddling furnaces and 12 heating furnaces, and 4 trains of rolls, driven by steam. In 1862 the Company erected an additional mill, adjoining the former, 350 by 90 feet, which has ten heating furnaces. The aggregate production of these mills in 1863 was at the rate of 35,000 tons of rails per year, but the Company are now producing at the rate of 1000 tons per week, and expect soon to have facilities that will enable them to produce 70,000 tons per year.

In the Appendix to this volume will be found a list of all the anthracite and charcoal furnaces, and rolling mills, in operation in 1860 in the New England, Middle, and Western States.

MANUFACTURES OF PITTSBURG.

[Pittsburg is the principal seat of manufactures for the western district of Pennsylvania, as Philadelphia is of the eastern. From the extent of its manufactures of Iron, it has been called the Birmingham of America. In amount, however, if we can at all rely upon the return of the census-takers, the products of its industry do not equal those of cities less widely known as manufacturing centres. The following has been furnished us from the Census Office in advance of official publication, as the statistics of manufactures in Alleghany County, of which Pittsburg is the capital, for the year ending June 1, 1860.]

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Agricultural implements	5......	$28,500......	$6,420......	31......	......	$29,218
Plows	8......	111,000......	73,050......	65......	......	144,500
Bags..........	1......	10,000......	37,858......	8......	7.	75,000
Boots and shoes....................	178......	185,975......	179,359......	614......	64......	457,685
Brass founding	7......	95,200......	64,967......	129......	......	126,256
Cabinet furniture	18......	140,150......	44,244......	243......	......	156,775
Bedsteads	2......	12,000......	6,575......	30......	......	25,300
Chairs...........................	4......	10,150......	17,000......	34......	......	40,064
Carriages.........	13......	53,750......	40,808......	140......	......	121,695
" childrens'	1	5,000......	14,885......	15......	......	42,500
Chemicals................................	2......	206,000......	83,960......	307......	......	202,000
Cigars.	28......	93,900......	63,853......	158......	......	133,456
Clothing	48......	427,200......	490,110......	639......	1,032......	1,032,795
Copper	1......	20,000......	37,500......	42......	......	77,500
Copper rolling	1......	20,000......	303,000......	10......	......	32,000
Copper smelting (1)..............	2......	950,000......	365,630......	65......	......	457,768
Cotton goods...........................	5......	925,000......	683,643......	301......	870......	1,076,383
Flour	52......	452,500......	1,197,148......	120......	......	1,336,741
Glass ware (2)..........	5......	285,000......	105,211......	334......	......	286,717

(1) The ore used in these smelting works is from Lake Superior, and is conveyed from thence by way of Cleveland, on Lake Erie, to Pittsburg. It consists of large solid masses of native Copper, cut with a cold chisel for convenience of transport into pieces weighing from 3 to 4 cwt., and is often of great thickness. It is also found in "pearls," or washings, of very good quality. The copper when melted is cast into bars and ingots, or rolled into sheets, and in these forms is sent to the various seats of manufacture in the United States. Messrs. Hussey have one furnace constantly employed in reburning the "slag" of former refinings, from which they obtain 2½ per cent of copper.

In addition to preparing the copper in sheets and bars, copper tubes for steam-boilers and cooking dishes adapted to the stoves so extensively used for domestic purposes, are also manufactured. The latter, being tinned inside after the manner of ordinary hollow ware, form durable and useful utensils.

The great abundance of coal in the neighborhood of Pittsburg gives it great advantages in the smelting of ores.

(2) Pittsburg is chiefly the seat of the Glass trade for the supply of the South and West, and its productions are confined mainly to the more useful articles for domestic use. The metal moulds for the manufacture of pressed Glass are made upon the premises of each manufacturer, and as the production of a novelty is a point aimed at by each as an important element of success, the getting up of new designs demands a considerable amount of care and attention. Pittsburg has every facility for the prosecution of the glass manufacture to an enormous extent.

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Glass, window	13	1,682,600	594,408	1,785	......	1,788,426
Glue	5	63,700	47,165	46	......	94,050
Hardware, locks, etc.	12	439,900	180,199	576	......	569,303
Hats and caps	4	22,100	6,560	9	8	18,475
Horse powers	1	1,500	1,155	2	......	3,215
Hosiery	3	5,000	4,400	9	......	8,800
Instruments, optical	1	5,000	506	2	......	2,100
" surgical	1	10,000	1,000	5	......	10,000
Iron, bar and sheet (1)	13	3,380,000	2,116,000	2,323	......	3,761,683
Iron, pig	3	233,000	195,620	150	......	265,800
Iron founding (2)	17	742,000	313,562	644	......	824,488
stove founding	5	330,000	131,245	314	......	381,750
Iron forging	1	11,000	6,800	7	......	12,795

(1) During 1863 important additions were made to the number of Rolling Mills in Pittsburg. Messrs. Lyon & Shorb, of the "Sligo Works," put up a mill two hundred feet in length by one hundred and four feet in width, capable of turning out armor-plates of the largest size. The firm also erected a Sheet Mill ninety feet long by eighty feet wide. Messrs. McKnight, of the Birmingham Works, erected a new Sheet Iron and Armor-Plate Mill, the buildings of which are sixty by eighty feet. The Plate mill has a capacity of fifty tons per week, and is constructed with a view to the rolling of sheet iron, for the production of which it has a capacity of one thousand tons a year. Messrs. Jones & Laughlins, of the American Works, erected a building two hundred by one hundred and twenty-five feet, within which is constructed two sheet mills and a twelve-inch train for bar, and three eight-inch trains for small iron and hoops; three heating furnaces, and two annealing furnaces. The capacity of these mills is thirty tons per day. Messrs. Reese, Graff and Dull built a Forge, a Plate mill, and a Sheet mill, occupying a building two hundred and five by one hundred and five feet. The plate mill is constructed for rolling Armor Plates for naval use, ten feet long and from one to one and a half inches thick, weighing from one thousand six hundred pounds to a ton each. The plate mill has a capacity of one hundred tons, the sheet mill a capacity of fifteen tons, and the forge of two hundred and ten tons a week. They also erected a Hoop mill of two trains, with a capacity of eighty tons per week, the mill building of which is one hundred and twenty by seventy-five feet. Messrs. Kloman & Philippe, and Messrs. Wharton, Brothers & Co. also erected new mills.

(2) We judge that the census-takers have erred greatly in their return of Iron Founding in Pittsburg, or the product for the year ending June 1, 1860, was much below the average. Certain it is that during the last two years one establishment, the FORT PITT WORKS, have produced more than twice the amount returned as the product of 17 foundries. This is one of the few establishments in the country which have complete facilities for the manufacture of heavy Ordnance, and during the last three years they have turned out enormous quantities of Shot, Shell, and 10 and 15-inch guns. Their latest achievement is the casting of a monster Columbiad of 20 inches calibre, designed to throw solid round shot that will weigh 1000 pounds, and 700 pound shell. This gun, when cast, weighed 170,000 pounds, and when finished will weigh about 115,000 pounds. The whole length from breech to muzzle is 243 inches, length of bore 210, maximum diameter 64 inches, minimum 34 inches. To cast it three furnaces were charged with metal, chiefly Bloomfield iron, one with 39 tons, and each of the others with 23½ tons, which were reduced in about six hours; and in twenty-five minutes after the furnaces were tapped 170,000 pounds passed through the pool into the mould, being nearly 7000 pounds per minute. For turning this immense casting the proprietors of these Works have constructed an enormous lathe, probably the largest ever built. The weight of the several pieces of metal composing it is over 200,000 pounds.

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of Product.
Iron railing	1	600	4,957	8	......	12,000
Japanned ware	2	54,000	23,452	51	3	57,500
Jewelry	3	5,900	775	4	......	3,500
Lamps	1	900	2,800	1	......	3,800
Lasts	1	425	410	2	......	2,060
Leather	27	282,800	350,966	167	......	452,467
Liquors, distilled	3	3,000	5,430	4	......	10,000
malt	32	354,400	290,937	172	......	494,785
rectified	19	130,500	165,820	49	......	231,022
Lumber, planed	12	185,600	173,756	135	......	300,620
sawed	42	417,200	320,776	242	......	527,147
Machinery, steam engines, etc.	24	436,500	450,276	315	......	1,031,963
Matches	4	3,850	1,420	7	3	4,550
Millinery, etc	27	23,075	28,891	118	......	60,110
Military equipments	1	331,000	17,585	53	......	29,236
Mineral water	2	2,600	2,325	6	......	6,700
Mirrors	1	6,000	12,793	12	......	186,000
Nails	5	1,250,000	728,275	880	20	1,140,580
Oil, linseed	4	79,000	38,750	17	......	64.450
Petroleum, crude	1	3,000	10,000	6	......	16,000
refined	1	4,000	4,000	2	......	6,000
Painting and glazing	3	11,200	2,600	10	......	95,500
Paper	1	9,000	468	9	3	2,000
Patent medicines	5	16,500	10,600	7	3	23,400
Picture frames	5	18,000	15,335	17	......	39,270
Pottery ware	5	18,000	6,446	41	......	22,963
Printing	13	248,400	138,684	326	40	538,103
Rope and cordage	6	17,600	17,615	27	......	31,400
Salt	11	63,500	23,698	84	......	101,200
Sand washing	1	42,500	3,000	20	......	125,000
Safes, iron	1	4,000	8,910	17	......	28,140
" provision	1	500	1,017	2	......	1,706
Saddlery and harness	10	12,950	17,288	41	......	41,454
Sash, doors and blinds	7	21,600	14,300	35	......	32,350
Silver ware	1	2,500	2,040	2	1	2,150
Silver plating	1	5,000	3,500	15	......	13,000
Soap and candles	15	278,800	441,107	98	......	646,606
Spices and coffee, ground	1	6,000	11,550	7	......	30,000
Spikes, railroad	2	175,000	158,500	110	......	325,000
Springs, railroad car	1	15,000	25,100	7	......	75,000
Steel	6	1,230,000	317,125	522	......	880,000
Tin, sheet-iron & copper ware	37	84,637	71,426	140	......	174,491
Trunks	3	18,600	17,314	34	......	49,000
Vinegar	8	27,850	14,554	19	......	54,585
Wheelwrighting	25	124,400	87,346	179	......	278,177
White lead	2	150,000	92,500	37	......	124,500
Wigs and hair work	3	2,600	2,500	4	3	9,842
Wire work	2	1,200	600	3	......	2,376
Woolen goods	6	83,500	61,730	55	36	98,500
Wool pulling	5	6,900	17,825	19	......	33,475
Total, including miscellaneous manufactures not above specified	1,119	$18,873,096	$12,553,984	17,183	2,184	$25,413,039

MANUFACTURES OF NEW YORK AND BROOKLYN.

[According to the census of 1860 the aggregate of production in New York City exceeded that of any other city in the Union. It is but fair to add, however, that the items of Printing, Book, Job and Newspaper, amounting to over ten millions of dollars, and of Sugar Refining, amounting to over nineteen millions of dollars, caused the excess of production.]

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.	Brooklyn and Williamsburg, Annual Product.
Agricultural implements	1	$5,000	20		$33,500	$256,000
Alcohol	1	125,000	20		500,000	1,249,000
Artificial flowers	16	267,200	39	390	984,500	
Bakers' bread and crackers	205	573,748	998	111	4,367,993	1,139,846
Billiard tables	4	49,000	134		269,650	
Bookbinding and blank books	37	407,400	580	471	1,036,218	
Boots and shoes	491	1,012,680	2,644	440	3,869,058	322,977
Boxes, paper	24	121,496	182	359	438,996	
Brass founding	26	178,259	320		570,660	5,000
Britannia ware	3	11,500	14		31,000	
Brushes	22	283,100	245	15	595,957	14,780
Candles, adamantine	2	275,000	91	6	414,000	180,000
Caps	18	67,050	97	134	359,557	
Cards, playing	2	63,000	51	49	154,000	
Carpets	9	766,200	466	580	930,149	
Carriages and coaches	32	179,800	565		599,825	112,500
Cars and omnibuses	1	100,000	125		125,000	
Chairs	37	304,425	568	6	714,026	
Chemicals	5	28,000	24		82,500	459,800
Cigars	162	277,100	843	29	1,114,451	169,930
Cloaks and mantillas	15	81,700	18	379	616,400	
Clothing	303	5,645,800	10,954	10,624	17,011,370	210,486
Coffee and spice grinding	11	179,100	81	2	426,184	100,538
Confectionery	38	352,150	369	117	1,208,536	37,720
Coopering	43	207,850	484		538,160	481,606
Copper work	16	75,700	105		265,200	131,434
Cordage	10	26,850	140	16	190,600	1,390,196
Cured meats	20	678,000	205		3,211,730	
Drain pipe, pottery, etc.	7	17,800	158	6	294,700	372,605
Drugs, medicines, etc.	13	155,400	68	18	480,200	10,000
Earthenware	2	160,000	159	8	165,000	45,000
Edge tools	5	20,400	33		55,812	
Embroideries	3	11,000	3	78	56,216	
Engraving, plate and plate printing	29	46,850	123		140,700	
Engraving, seal and die sinking	36	38,600	127	2	152,730	
Engraving, wood	29	49,650	147		138,666	
Envelopes	9	236,300	110	179	602,700	
Firearms	7	26,300	88		62,850	
Fire engines	4	43,500	73		68,850	
Fishing tackle & fish-hooks	4	8,900	10		13,000	157,000

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.	Brooklyn and Williamsburg, Annual Product.
Flour and meal	6	$272,800	193		$2,612,500	$283,800
Furniture, cabinet	185	1,451,500	2,967	19	3,789,634	272,828
Furs	29	668,700	237	500	1,970,130	51,000
Gas	2	4,000,000	2,020		3,284,500	767,000
Gas fixtures	17	232,350	578		635,950	97,000
Gas meters	1	75,000	120		100,000	
Gilt frames, mirrors, etc.	21	189,600	368		548,300	20,000
Glassware	4	6,300	25		32,750	504,436
Gold and silver refining and assaying	5	229,800	37		420,570	
Gold chains, jewelry, etc.	103	1,204,048	1,088	71	2,497,761	146,700
Gold leaf	5	16,000	38	16	85,872	
Gold watch cases, etc.	19	96,900	127	3	337,690	
Grates and fenders	7	85,000	67		161,000	82,700
Gutta percha goods	2	100,000	34		125,750	
Haircloth	2	82,000	25	170	95,500	
Hats: silk, felt, and straw	44	334,900	588	205	2,215,783	1,082,456
Hoop skirts	29	267,800	210	1,464	2,064,667	167,280
India-rubber goods	2	306,000	69	53	380,000	
Ink, printing	6	131,000	34		542,000	68,800
Ink, writing	2	6,850	29	3	31,658	12,000
Iron forging	1	150,000	60		130,000	
Iron founding	41	1,674,300	1,904		2,571,490	284,670
Iron, galvanized	1	30,000	40		84,000	
Iron, malleable	1	16,000	15		20,000	
Iron, pig	1	100,000	45		216,000	
Iron pipes	3	60,000	102		250,000	85,000
Iron and wire railing	22	297,100	337		720,450	48,000
Iron machinery, steam engines, etc.	42	2,511,100	2,859		4,560,942	1,278,800
Lamps and lanterns	8	88,000	102		226,360	7,270
Lead, lead pipe and shot	4	950,000	126	2	1,937,000	10,700
Leather	7	66,000	55		197,225	121,875
Leather belting and hose	2	104,000	42		217,000	
Lithographing	23	157,850	321		383,700	
Locks	19	61,900	98		93,200	34,068
Mahogany sawing	7	108,500	51		372,100	
Malt	7	443,000	97		681,000	
Marble cutting	40	494,700	832		1,260,949	471,390
Matches	2	110,000	172	170	41,200	15,000
Mathematical instruments	15	137,900	57		77,116	2,500
Malt liquors	46	1,605,090	546	2	2,149,875	738,828
Military equipments	5	42,300	64	16	134,850	
Military ornaments	1	700	4		12,000	
Millinery	90	189,750	42	778	1,022,635	58,800
Millinery goods	9	31,500	44	265	238,154	
Mineral water	14	86,000	165		244,378	162,400
Morocco	10	289,000	242	21	677,169	687,600
Musical instruments, miscellaneous	4	10,000	16		27,600	
Melodeons	2	100,500	102		160,000	
Organs	4	54,000	118		112,000	
Piano-fortes	33	1,912,700	1,728		2,429,867	74,000
Nails and spikes	4	5,900	14	2	40,000	36,000
Nuts, bolts and washers	4	41,000	60		71,500	
Oils, coal	1	50,000	12		96,000	301,110

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.	Brooklyn and Williamsburg, Annual Product.
Oils, lard	8	$165,000	56		$1,650,000	
linseed	2	200,000	70		660,000	$1,610,704
sperm and whale	5	523,000	53		1,170,481	
Optical instruments	3	7,800	31		66,620	
Paints and colors	10	597,500	272		803,500	
Paper	1	140,000	160		200,000	
Paper hangings	7	315,000	476	2	791,000	390,000
Photographs	30	101,980	129	10	427,202	1,200
Photographic materials, etc.	4	118,000	51	125	191,000	
Planed lumber	5	60,000	76		626,000	156,108
Plumbing and gas fitting	43	247,075	379		724,150	163,465
Pocket-books, porte monnaies, etc.	32	161,550	362	241	499,190	1,322
Preserved fruit and pickles	9	101,500	46	75	464,575	
Printing, book	17	3,121,000	1,435	718	3,225,551	
Printing, job	31	645,800	839	82	1,033,658	
Printing, newspaper	51	2,941,200	2,329	157	6,182,946	143,167
Printing presses	5	746,000	515		737,000	
Saddlery and harness	56	94,000	238	1	331,281	65,282
Safes	7	415,000	346		467,975	320,000
Saleratus	5	219,000	121		932,500	56,000
Sashes, doors and blinds	37	227,200	338		577,844	91,150
Satinet printing	1	25,600	15		15,000	
Sawed lumber	12	414,000	245		1,127,175	207,382
Scales and balances	3	63,000	60		138,000	
School apparatus	1	5,000	10	4	15,000	
Sewing machines	13	217,300	267		839,000	149,000
Ship-building	12	271,800	382		1,178,488	1,263,475
Ship-smithing	20	56,450	122		173,636	2,000
Shirts, collars, etc	42	406,950	125	2,704	1,845,357	
Shovels and spades	2	10,000	22		47,000	
Silk fringes and trimmings	27	209,180	262	522	724,687	156,940
Silverware	20	437,000	422	19	1,250,695	18,700
Silver-plated ware	20	83,600	135	63	257,770	
Soap and candles	22	606,600	293	2	1,800,505	858,200
Spiral springs	1	48,000	15		20,000	
Spirituous liquors, rectified	15	366,000	85		969,650	796,640
distilled	2	40,000	13		124,380	1,861,420
Stair building	6	36,000	69		114,300	84,000
Stair rods	2	9,000	15		33,000	
Steam & hot water heaters	6	195,000	211		413,650	
Steel springs	8	111,600	44		225,000	
Stereotyping and electrotyping	11	73,500	162		193,500	
Stone cutting	36	400,400	951		1,152,880	471,880
Stove polish	2	13,000	18	2	44,000	
Stoves, ranges and heaters	23	260,100	268		533,600	12,000
Sugar refining	14	2,949,000	1,494		10,312,500	3,794,000
Surgical and dental instruments	6	212,000	108	8	147,464	65,000
Tin and sheet-iron ware	92	353,350	496	1	757,184	455,446
Tobacco and snuff	7	218,500	429	318	1,009,700	10,720
Trunks and carpet-bags	26	113,300	161	8	282,868	19,800
Turning, ivory and bone	8	40,300	137		152,904	
Turning, scrollsawing, etc.	27	274,800	437		766,000	142,000
Type founding	8	290,900	222	188	465,400	

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.	Brooklyn and Williamsburg, Annual Product.
Umbrellas and parasols....	18......	$382,500......	228......	706......	$1,660,066......	$13,380
Upholstery	24......	137,450......	96......	80......	653,480	7,900
Varnish..........................	2......	310,000......	74......	......	470,000......	204,300
Vinegar..........................	6......	40,000......	25......	......	65,470......	34,550
Wheelwrighting	58......	217,925......	503......	......	624,985......	125,087
White lead and zinc paints	1......	20,000......	10......	......	200,000......	2,129,500
Willow ware.....................	6......	3,820......	20......	......	15,408......	3,312
Wire drawing..................	3......	29,000......	51......	......	156,008......	
Wire work........................	11......	57,200......	165......	......	139,550......	17,200
Woodenware....................	3......	13,500......	22......	......	25,800......	
Total in 1860, including miscellaneous manufactures not above specified	4,374 ...	$61,171,757......	66,470......	24,718 ...	$159,082,366 ...	$34,251,390

REMARKABLE MANUFACTURING ESTABLISHMENTS IN NEW YORK AND BROOKLYN.

The Marine Engine Works.

It has been well remarked, that as the city of New York is sustained almost entirely by its commerce, and as this commerce is becoming every year more and more dependent for its prosperity and progress upon the power of the enormous engines by which its most important functions are now performed, the establishments where these engines are invented, made, and fitted into ships, which they are destined to propel, constitute really the heart of the metropolis; that the splendor and fashion of the Fifth Avenue, and of Union Square, and the brilliancy and ceaseless movement of Broadway, are mere incidents and ornaments of the structure; while these establishments, and those of kindred character and functions, form the foundations on which the whole of the vast edifice reposes.

In the first volume of this History were noticed the various attempts, of which any record is preserved, that were made during the last century to build steam engines in America, and the fact that Robert McQueen, of New York City, was probably the first who made the building of stationary engines a specialty. The rise of the Marine Engine Works may be said to date from the success of Robert Fulton in applying steam power to propelling vessels, as demonstrated by his steamboat *Clermont*, in 1807, whose speed was five miles an hour. Her engines and boilers were imported from England, and were manufactured by Bolton & Watt, of London. Very soon after the success of this first effort, Mr. Fulton erected a shop at what is now known as Jersey City,[1] where he built the *Car of Neptune*, and finished other engines during the balance of his life—the iron castings having been furnished by Robert McQueen and John Youle, and the brass castings by James P. Allaire, all of New York. Early in the year 1815, upon the death of Robert Fulton, Mr. Allaire obtained a short lease of his shop and tools, and, taking as partner Charles Stoutinger (Mr. Fulton's engineer), immediately commenced building the engine of the steamboat *Chancellor Livingston*, which developed a speed of eight miles per hour, with a cylinder 40 inches diameter and 4 feet stroke. Even at that early day, Mr. Stoutinger predicted that the cumbrous machinery then used in the engine would be dispensed with, that the running time of steamboats from New York to Albany would be about eight hours, and that steamships would cross the Atlantic Ocean within eleven days' time. It required almost the entire year to complete the engine and boiler of the *Chancellor Livingston*, about the close of which the copartnership of Allaire & Stoutinger was dissolved by the death of the latter. As Mr. Allaire had been in business as a brass founder at 466 Cherry Street, New York, since 1804, he transferred all the machinery and tools from Jersey City to that locality, in 1816, where he laid the foundation of the present establishment, the oldest of the existing steam engine works in New York, now so extensively and favorably known as

The Allaire Works.

From the earliest period of Mr. Fulton's efforts in developing steam as a motive power in navigation, Mr. Allaire felt a deep interest in the subject; and as all the brass castings of Fulton's engines had been furnished by him, he had had excellent opportunities of acquiring the requisite information to fit him to become Fulton's successor, and to carry out Stoutinger's idea of simplifying the construction of the steam engine. Immediately, then, on the removal of his machinery and tools to the scene of his earliest labors in brass founding, he devoted his best

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(1) Mr. Zeno Secor's Fulton Iron Foundry, in Greene Street, Jersey City, marks the locality. Mr. Secor has just constructed and delivered to the United States Government the iron-clad Monitors *Weehawken*, *Comanchie*, *Tecumseia*, *Manhattan*, and *Mahopac*. A large number of workmen are employed here, who within three years have completed work that is estimated to be worth three millions of dollars.

efforts to improve upon all that had been previously done. He now built the engines of the steamboats *Savannah*, *North Carolina*, *South Carolina*, and *Robert Fulton*. The *Savannah* was finished in 1817, and will be remembered as having made the voyage to Liverpool in 1819, and as being the first steamship that crossed the Atlantic Ocean. Her original cylinder was on exhibition at the World's Fair, in New York, in 1853—diameter 44 inches, 5 feet stroke.

There was now found to be a demand for increased accommodations on the Hudson River, and the steamboats *North River*, *Fire Fly*, and *Chief Justice Marshall*, were built for that trade—each of them having boilers made of copper—as there was then no iron of suitable quality manufactured for the purpose, nor was it believed that this metal had the requisite tensile strength to stand the pressure. At this period wood was universally used for generating steam; and, with the flames extending out of the smoke-stacks of the steamboats at night, as they passed up and down the river, they were the wonder and awe of the ignorant and superstitious who beheld them. About this time anthracite coal was being developed to a limited extent in Pennsylvania, and Mr. Allaire entertained the opinion that it was possible to use it as a fuel for making steam. Most of his associates in steamboating resolutely opposed his theories on that subject; but he at length prevailed upon them to allow him to make the experiment, and the *Car of Neptune* was laid up to have new and suitable grate bars put in her furnace for that purpose. Such was the prejudice against this new innovation, that the firemen of the boat refused to attempt to burn "black stone," declaring it an impossibility, and Mr. Allaire was obliged to take some of his best workmen from his shop to assist him, and he (being chief fireman) did actually, after most herculean exertions, succeed in getting the boat to Albany in eighteen hours. Notwithstanding this trial had demonstrated that it was possible to use anthracite coal as fuel to make steam, Mr. Allaire's associates were too conservative to aid in developing a better method of accomplishing the purpose, and steamboats continued to light the heavens in their nightly voyages on the Hudson River for a longer period—wood being the only fuel that was deemed practicable.

Mr. Allaire continued in the business on his own account until the year 1842, always exerting himself to his utmost to improve and simplify the steam engine, giving his personal attention to details, and instructing his subordinates to invariably reject imperfect castings, and to permit no piece of machinery to pass their inspection unless it was perfect of its kind. During the year last named Mr. Allaire associated others with him, who formed a joint-stock company, incorporated under the statutes of the State of New York, with a cash capital of $300,000, and they elected him their first President—which office he filled for eight years, retiring from the concern in 1850. The management of the works then passed into the hands of T. F. Secor, formerly of the Morgan Iron Works, who is general agent of the company, and the engines of the steamers *Baltic*, *Pacific*, *Illinois*, and *Panama*, may be cited as evidence of the continued capacity of the Allaire Works to build marine engines. The engines of the *Isaac Newton*, *Bay State*, and *Empire State*, on the Hudson River and Long Island Sound; the *Western World*, *Metropolis*, and *Niagara*, on Lake Erie; and the *America* on Lake Champlain, were also built here.

Among the more recent productions of this establishment, may be named the steamship *Vanderbilt*, as having the largest beam-engine on a sea-going steamer—with two cylinders, each 90 inches diameter, and 12 feet stroke; the steamers *Hu Quang*, *Po Yang*, *Kin Kiang*, and other vessels for the China trade. The chief work of this establishment has been for river and ocean navigation; but stationary engines have also been built here, and the company points with pride to a Cornish engine at the Cleveland (Ohio) Water Works, as a specimen of their skill in that direction; and also to the pumping engines of New Orleans.

A faint idea of the progressive increase of this manufacture may be gleaned from the fact, that while during the first year Mr. Allaire was in business as an engine builder, he was able to complete only a single one, now the Allaire Works occupy fifty-two lots of ground, each 25 by 100 feet, and employ about 1000 workmen, who turn out machinery annually that is estimated to be worth one million of dollars. A large number of men are now employed in the construction of a propeller engine, with a cylinder 100 inches in diameter and 4 feet stroke, intended for the double-turreted iron clad called the *Puritan*, one of Captain Ericsson's vessels of the Monitor style, and ordered by the United States Government.

The Novelty Iron Works.

About thirty-five years ago Rev. Eliphalet Nott, D. D., President of Union College, at Schenectady, New York, who had been very successful in the use of anthracite coal for warming houses, invented a boiler, with its appurtenances, for applying that fuel, then not used for such a purpose, to the generation of steam, and decided to test its merits fully by building a boat and equipping it with his improved boiler and engines. In the plans determined upon, he was not only to use a new fuel, but a new boiler, and an engine constructed unlike any used in New York waters. His boat, therefore, embraced much that was *new*, and consequently received the name of "*Novelty*." Dr. Nott, finding that his projected enterprise would require special arrangements, not only for its creation, but also to enable him to keep the boat in the proper repair, decided to purchase the premises then known as Burnt Mill Point, on the East River, where a small wharf and some farm buildings furnished all the room he required. One of the engines of the *Novelty* was in a great measure built here with limited mechanical resources. From time to time the power and tools were added to, and when they were increased to an extent that enabled work for other parties to be undertaken, they were applied to such purpose. The place and shop where this work was being done for the steamboat *Novelty*, now became known in the neighborhood as the "NOVELTY WORKS,"—and thus originated the distinctive name by which it is still known throughout the engineering world.

At the time these new operations were carried forward, the business was conducted by the firm of H. Nott & Co., under the superintendence of N. Bliss, formerly of the West, who had recommended the use of the horizontal style of engine for the boat—the foreman being Ezra K. Dodd, who afterward was chief engineer of the *Novelty*. Subsequently Thomas B. Stillman had charge of the works, until the year 1838, when John D. Ward, Thomas B. Stillman, Robert M. Stratton, and C. St. John Seymour, purchased the premises, machinery, tools and fixtures, and conducted the business under the name of Ward, Stillman & Co.—the first two of the partners having charge of the mechanical operations, while the two latter-named gentlemen gave their attention to financial affairs. During the time the establishment was in their hands, its capacity in machinery and tools was greatly increased, and among the work turned out were the two ocean steamers, the *Lion* and the *Eagle*, constructed for the Spanish Government, and still in use under different names. In 1841, the firm of Ward, Stillman & Co. was dissolved by the retirement of J. D. Ward, and the establishment was conducted by Stillman & Co. In 1842, a new firm was created by taking in Horatio Allen, (the gentleman who imported the first locomotive engine into this country,) and the business was conducted under the name of Stillman, Allen & Co.—Mr. Seymour having retired. In 1855, the stock, machinery, tools, patterns, etc., were sold to an incorporated company, under the title of the Novelty Iron Works, of New York, whose cash capital is $800,000, by which company the business has been conducted up to the present time. Prior to the incorporation of this company, the term Novelty Works was merely a designation of the place where the several firms carried on business; but since its incorporation The Novelty Iron Works is the legal designation of the body corporate by whom the works are carried on. At present, the principal management is in the hands of HORATIO ALLEN, President, and W. E. Everett, Secretary.

The entrance to the works is on Twelfth, opposite Dry-Dock Street, where there is a large gateway, near which is a porter's lodge, with doors leading to the offices and to the drawing-room. At a short distance from the gate, and within the enclosure, there is a great crane for receiving or delivering the vast masses of metal, such as shafts, cylinders, boilers, vacuum pans, and other portions of the ponderous machinery that are continually passing to and from the yard. Turning to the left, and just beyond the crane, is the iron foundry—a building 206 feet long by 80 feet wide, with a wing upon one side. It contains four cupola furnaces, capable of melting at one heat sixty-five tons of iron, which can be deposited into one mould, making a single casting of that enormous weight. There is an additional furnace for special uses, and is employed as occasion requires. The blast for the furnaces is brought under ground through a pipe having a sectional area of five square feet. Opposite the furnace are six drying ovens, each having a railway and two carriages, and each within a sweep of one or more of six cranes, some of which are capable of hoisting twenty tons. Within this foundry, and below the surface of the ground, there are moulding pits, twelve feet in diameter and eighteen feet deep, the sides of which are firmly secured by plates of boiler iron riveted together. Six weeks are sometimes required to prepare the moulds for loam castings, employing from ten to forty men. Five of the strongest men are required to carry a ladle of molten iron from the furnaces to the reservoir from which it is discharged into the mould. The process of clearing the mould and hoisting out the casting requires about a week. In illustration of the capacity of this foundry for heavy work, it is sufficient to say that here were made the bed-plate of the steamship *Atlantic*, which weighed thirty-seven tons, and that of the *Arctic*, which weighed sixty tons. In the summer of 1854 there was also cast the cylinder of the steamship *Metropolis*, of the Fall River line, which was then the largest in the world—having a diameter of 105 inches, and a length of 14 feet, with 12 feet stroke of piston. Twenty-two persons sat down to lunch in this cylinder, with room to spare, and a horse and chaise were driven through it, both backwards and forwards.

In the smiths' shop, where all the wrought iron parts of the machinery are formed and fitted, there are thirty forges, with the requisite number of men to each. Here also are large cranes, with chains connecting with small trucks on the top of the beams, for carrying whatever may be suspended further outward, or drawing it in, as may be required. These trucks are moved by a wheel at the foot of the crane, and are capable of carrying extraordinary weights. In one instance a single block of iron was forged which weighed 14,366 pounds. When forging such enormous masses, they are trucked up in a furnace to be heated, where they remain several hours. The masonry is then broken away, and the red-hot iron is lifted by the crane and placed under a massive trip-hammer. When the process of forging so large a mass of iron is going on, one man throws water upon the works to effect some purpose connected with the scaling, while others busy themselves about getting it into the requisite shape and dimensions as the forging proceeds.

Adjoining the smiths' shop are the machine and finishing shops, where the cylinders, piston rods, and other parts of the machinery, after being cast, are subjected to a refining and polishing process. These are provided with lathes, cutting mills, and planers of vast size and strength. There is also a brass foundry and a coppersmiths' room, each furnished with a crane and its appropriate tools. There are two boiler shops, provided with enormous shears to cut the iron plates into proper forms, rollers to give them the required curvature, punching machines to make the holes along the edges in which the rivets are inserted, and numerous drilling and boring machines. The whole establishment is divided into twenty departments, at the head of each of which is a foreman to superintend those under his particular direction, namely—iron founders, brass founders, machinists, boiler makers, carpenters, coppersmiths, blacksmiths, metallic life-boat builders, instrument makers, hose and belt makers, painters, masons, riggers, laborers, cartmen, watchmen, storekeepers, pattern makers, draughtsmen, and clerks; in all averaging more than one thousand men; and the value of the work finished is about $1,330,000 per annum.

The establishment occupies almost two entire blocks of ground, and includes two slips capable of accommodating the largest steamships.

There are ten other Marine Engine establishments in New York and vicinity, viz.: the Delamater Iron Works, Morgan Iron Works, Neptune Iron Works, Dry-Dock Iron Works, Fulton Iron Works, and Fletcher, Harrison & Co.'s; McCloud & Co.'s and Essler & Co.'s at Brooklyn; the Continental Iron Works at Green Point; and the Fulton Foundry at Jersey City. The aggregate capital invested in the marine engine business in New York and its immediate vicinity is about $1,500,000, employing upwards of 4000 workmen in the various departments, whose annual product approaches $6,000,000 per annum.

The Sugar Refineries—Stuart's Refinery.

The Refining of Sugar is the leading manufacture in the City of New York. No other employs so much capital, or yields so large a product. The official return of the sugar refined in 1860, which we have given in the Table, vast as it is, is little more than one half of the value of the present product of 26 Refineries in New York and vicinity, which is estimated to be about $35,000,000 per annum. The history of the business as a prominent pursuit is so intimately associated with the enterprise of one firm, that, in describing their facilities and processes, we describe those of all the others.

Prior to the year 1832, Sugar refining was conducted on a limited scale, but the process was very imperfect, and the quality of the sugar, as compared with that now made, was very inferior. During that year Messrs. R. L. & A. STUART commenced business in three small wooden buildings on the corner of Chambers and Greenwich streets, where they were the first to succeed in employing steam in refining; and by the introduction of superior machinery, they were soon enabled to produce a better quality of Sugar than had hitherto been offered to the New York public, some samples of which, exhibited at the Fair of the American Institute, in 1834, were the wonder and admiration of other Refiners. The capacity of the establishment was then limited to about 3000 pounds per day; but in the year 1835 the old wooden buildings were removed, and a six-story brick building was erected in their stead, by means of which the capacity for refining was increased to 12,000 pounds per day—about enough to meet the demand at that time—at profitable rates. But as the quality of the sugar grew better, the consumption increased also, and in 1849 the Messrs. Stuart erected the nine-story brick building on the corner of Greenwich and Reade streets, and their capacity was then so much increased as to enable them to use from 40,000,000 to 44,000,000 pounds of sugar per year, employing about 300 men, and producing refined sugar that was sold for $3,000,000 per annum. During the year 1863, this Refinery worked but little more than half its capacity; but the sales of refined sugar—the prices of raw being about double those of any previous year—amounted to over three millions of dollars.

The whole establishment, with all the necessary machinery and appurtenances, occupies a space of 110 feet on Chambers Street, 165 feet on Greenwich Street, and 167 on Reade Street, with an addition of 75 feet, five stories high, on the north side of the street last named—the whole having cellars beneath them, and vaults the entire length of their fronts, and extending half-way across the first two named streets, while they occupy all the space beneath Reade Street, and extend under the building on the opposite side. This immense establishment is provided with every variety of machinery for saving human labor. Steam is not only used in the process of refining, but in lifting, hoisting and pumping, and it requires eight large steam-boilers, which consume 8,000 tons of anthracite coal per annum, to furnish the requisite steam for all these purposes. About 200,000 gallons of water per day are drawn from the wells beneath the buildings, and 50,000 in addition taken from the Croton Water Department, making a total consumption of 250,000 gallons of water per day. For efficiency, rather than for purposes of economy, this firm constantly employs workmen in every branch of mechanics required in their business, viz., coopers, carpenters, machinists, blacksmiths, masons, box makers, a painter, and a tailor, and rarely have occasion to call on outside parties for assistance either for repairs or construction. By this means every thing is kept in a thorough state of repair, and when delays do occur from accident they are necessarily of short duration.

The sugar is received in hogsheads, boxes, etc., on the first floor, and hoisted by steam to the ninth story, where they are emptied, and the process of cleansing commences by dissolving the sugar in steam and hot water, and the color extracted from the solution by means of chemical and mechanical agents, when it is passed to vacuum pans, heated by steam, and through the subsequent processes by which Sugar is crystallized and refined.

Besides Stuart's, there are in New York the Refineries of the N. Y. STEAM SUGAR REFINING Co.; WILLIAMSON, GRIFFITHS & Co.; JOHNSON & LAZARUS; JOHN W. BROCKHORN; CAMP, BRUNSEN & SHERRY; HARRIS & DAYTON; F. H. MCCREADY & Co.; DANIEL POMROY; OCKERHAUSEN BROTHERS; WILLIAM MOLLER; PLUME & LAMONT; MOLLERS, HOGG & MARTENS; KATTENHORN & TUSKA; GREER, TURNER & Co.; BOOTH & EDGAR; BRECK, CUSHMAN & STANTON; MOLLERS, O'DELL & DOSHER; and BRUNJES, OCKERHAUSEN & Co.—in Williamsburg, HAVEMEYERS & ELDER, SHEPPARD & GANDY, C. E. BERTRAND & Co., and WINTJER, DICK & SCHOMACHER—in Brooklyn, MEYER & GIMBERAT, and FINKEN & WHEATLEY—at Greenpoint, BROWN, FURBISH & Co.—and MATTHIESSEN & WIESCHERS at Jersey City. These Refineries are now producing about $35,000,000 per annum, but have a capacity for production equal to 500,000,000 pounds, which, at present prices, would be worth at least $80,000,000.

THE INDIA RUBBER MANUFACTURES.

New York Belting and Packing Company.

The history of the manufacture of India Rubber Goods in this country cannot yet be written, mainly because those who possess the most important facts are interested in concealing them. The day is not distant, however, when this obstacle will be removed, and a truthful account of the authorship of the various inventions that have contributed to utilize this wonderful gum can be given. Suffice it to say for the present, that since 1825, when the first importation of the Para rubber over-shoe was made into the Boston market, inventions have been made by which the juice or milk of an East Indian tree is now available for Clothing of all kinds, Boots and Shoes, Belting, and Steam-packing for machinery, Carriage Tops and Car Springs, Balls and Tops for children, Combs, Whalebone, and an infinite variety of other useful articles; and though it may be impossible as yet to assign to each his exact share and measure of credit, the names of Thomas C. Wales of Boston, Stephen C. Smith of Providence, John J. Howe of Birmingham, Connecticut, Daniel and Nathaniel Hayward of Easton, Massachusetts, Charles Goodyear of New Haven, Connecticut, William Atkinson, Dr. Thomas, Jas. Bogardus, Horace H. Day, and John H. Cheever, all of New York, Charles Mackintosh, Thomas Hancock and Charles Kean, of England, and numerous others in both countries, will be duly honored for their several contributions in opening up this new field of industry.

There are now over thirty manufactories of India Rubber goods in the States of Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania and New Jersey, which have a capital invested of nearly $4,000,000, employ about 4,000 operatives, and produce fabrics valued at $6,000,000. Connecticut alone has thirteen India Rubber factories, owned principally by capitalists of New York, and whose products find their chief market in that city. The most noteworthy of these manufactories, and the one producing a larger product than any other in the country, is that of the NEW YORK BELTING AND PACKING COMPANY, which we select to illustrate the modes and processes adopted for manufacturing India Rubber goods in the best establishments.

The Factory is located on the Potatok River, in Newtown, Connecticut, a place that nature and art have combined to render attractive, and is the one in which Vulcanized Rubber was first practically manufactured under the direction of Charles Goodyear. The building is nearly 300 feet long, 41 feet wide, and five stories high; and to propel the ponderous machinery that is employed in the various processes of grinding and preparing Rubber, the Company have constructed a waterwheel fifty feet in diameter—which, with the exception of Burden's, at Troy, is probably the largest in the country. This is assisted by a steam-engine of three hundred horse power.

Before describing the details of manufacturing, however, we may remark, that as the goods made at this factory are designed principally for mechanical purposes, the proprietors spare no pains or expense to obtain rubber which has the strongest fibre ; and as the East India gum, or *ficus elastica*, has been found to be the best, they import that from Calcutta, Penang, and Singapore. It is imported in rude masses about two feet long and one foot thick, and covered with a rude matting, woven in wide meshes, through which the dark rubber is easily seen. A stock of hundreds of tons is constantly kept in their vaults or storehouses, which are built as nearly as possible fire-proof.

The first process which the imported material undergoes is to cleanse it of foreign matter, the masses of native rubber as they are gathered in the East Indian forests being so mixed with dust, and bark and leaves, that in cleansing they lose over 20 per cent. of their weight. The rubber is first placed in a large vat filled with hot water, where it remains for some time, until the exterior is partially softened and the workmen are enabled to strip off the basket-work that is woven around the original bales, and which adheres so closely that it can be removed only in this way. The masses of rubber are then cut into slabs of about an inch in thickness, by means of a large circular knife, between three and four feet in diameter, which is driven by machinery and revolves with great speed, cutting the tough mass as easily as if it were clay. The slabs of rubber are then taken to the "crackers," as they are called. These crackers are large deeply-grooved iron cylinders, invented for this purpose, which revolve in pairs, slowly and heavily, grinding the tough rubber between, and driving out much of the bark and dust. These machines are so skilfully arranged that the long slabs of rubber are stretched as they are drawn through, and much of the dirt and bark drops out and falls beneath the machines.

From the crackers the rubber is taken to the "washing-machine," a large vat, where it is cut into small pieces by numerous sharp knives which revolve under the water, and where it undergoes a kneading and washing process, very much like the process of preparing the pulp in paper-making. By this process all dirt and foreign substances are perfectly expelled, and the pure rubber alone is left. From the washing-machine the rubber is taken to powerful grinding-machines, which consist of large hollow cylinders of cast-iron. These cylinders revolve in opposite directions, and here the rubber, which is brought from the washing-machine in small fragments loosely adhering to each other, is pressed and kneaded into thick sheets or mats. At this stage the process is suspended for some time, in order that the rubber may be thoroughly dried and cured by the action of the air. For this purpose these mats are suspended in long drying-rooms, where they are allowed to hang for many months before they are thought fit for use. Of course, a large stock of this cured rubber is kept on hand. The rubber thus cleansed and dried is first taken to the mixing-machines. This is the first important process, as it is here that the rubber is combined with the metals and minerals to which metallic rubber owes its peculiar properties. The mixing-machines like most of the machines employed in the factory, are hollow iron cylinders, and it is necessary that they should be kept at high but regulated degrees of heat, as the tough masses of rubber would otherwise resist the action of machinery, however powerful. These cylinders are of great size and strength, and are heated by steam, which is let into the ends. Two are placed near together, which, as they revolve towards each other, knead the substances placed between them like dough. The rubber is placed in the machine, and as the heated cylinders slowly revolve, the tough rubber is twisted and kneaded, and torn between. This is accompanied by a constant succession of sharp explosions as loud as pistol-shots which are caused by the air being forced through the rubber. As the rubber is folded over and over, air is confined in the folds, and when that portion of the mass is forced between the cylinders, the air is driven through the tough material with an explosion like an air-gun. When the rubber is somewhat softened, the workman mixes slowly the various substances which are to be incorporated with it; these consist principally of sulphur and of the oxides of various metals, zinc, lead, iron, etc., which are combined in various proportions, according to the uses for which the rubber is destined. It is in this department that the greatest science and experience are required, for different qualities of rubber require different compounds, and every difference in the compound makes a different treatment necessary in the subsequent stages of the manufacture. When the rubber is thus prepared it is ready to be molded and shaped into the various forms in which it is to be finally perfected and used.

As every distinct manufacture requires a different process and different manipulations, we will only describe the process of making "machine-belting," as that is of most importance and is the article for which this company are so celebrated. The rubber, which, after it is compounded as above described, resembles a dark slate-colored dough, is then taken to another department to the "calendering-machines." These somewhat resemble the other machines, but they are composed of more cylinders, and are of much larger size, and of a perfectly polished surface. Upon these calenders the prepared rubber is placed, and after passing between the cylinders it is rolled out in a perfect and even sheet, upon a web of powerful cotton or linen duck, which has previously been coated with rubber, driven through and through its meshes by powerful machinery. This duck is somewhat similar to the heavy duck used for sails, but it is woven expressly for the New York Belting and Packing Company, in a factory which is exclusively employed for the purpose, and it is woven in a mode which gives it double the usual longitudinal strength.

The "bolts" of duck covered with rubber, after this process is completed, are taken to the belt-room; here the long webs are taken by the skilful workmen and unrolled upon tables 100 feet long, and in an incredibly short time, are cut into strips and folded together into machine-belting. In order to give the required strength to the belt, folds upon folds of the heavy duck are placed one upon the other, and then forced together by the tremendous power of the rolling-machines, until a belt is formed, more tough and solid than the best sole-leather.

From this room the belts are taken to the heaters. These are immense steam-boilers, with a long iron frame or railway, which can be thrust in or drawn out from the boilers at pleasure; the goods are placed upon the railway and rolled into the boilers, which are then closed, and steam is admitted. This part of the process is the most remarkable of all; for the rubber, which, when placed in the heaters, is like a tough, unelastic dough spread upon the various fabrics for which it is used, becomes wholly changed into the new and peculiar substance called metallic or vulcanized rubber. All the attempts of the most scientific chemists in this country and in Europe to discover the cause of this change, or to produce it in any other manner, have been wholly baffled. The causes, and even the manner of the change, are mysterious. All that is known is, that after the rubber has been heated at a regulated temperature from eight to twelve hours, it becomes a new substance, with properties unlike any other. The rubber-paste, which was soft and sticky, and but slightly elastic, becomes firm and dry, and ten times more elastic than the best native rubber. Heat and cold, which destroy the value of native rubber, have no effect upon it; the solvents in which the native rubber dissolved like gum have no influence upon it whatever; in fact it becomes, as it has been well called, an "elastic metal."

This Company make belts and bands of all sizes and lengths, from an inch to a yard or more in width, and adapted to all kinds of machinery. In their warerooms in Park Row there was recently a belt of seven plies thick, over a yard wide, and nearly 300 feet long. Such a belt, if made in the old-fashioned way, from leather, would have required the hides of 120 oxen, and would have been fastened together by thousands of copper rivets; but here the great rubber belt was made in one operation, without joint or seam or imperfection. With regard to the comparative merits of leather and rubber belting, a writer in the *Scientific American*, to whom we are principally indebted for these facts, says he saw the ends of a leather and rubber belt of equal size firmly clamped together, and when power was applied to tear them asunder the tough sole-leather parted with a loud explosion, but the rubber belt was unharmed. He also witnessed an experiment to test the comparative value of these belts in driving machinery, and says that the peculiar elastic and tenacious surface of the rubber belt enabled it to hold much more firmly upon the iron drums and pulleys than the hard leather. "An accurate measurement showed that it took fully 25 per cent. more power to slip a rubber belt on a smooth pulley than it did to slip a leather belt on it. A large iron pulley, such as is used in driving machinery, was placed upon a shaft, and a piece of rubber belting was passed over it. Heavy weights were then placed on each end of the belt, in order to bring it down firmly and with an even bearing upon the pulley. The question to settle was, whether leather or rubber belting would bear the greatest weight without slipping, for this would prove which had the most perfect friction-surface and would drive the machinery with least loss of power. To test this, weights were slowly added to one end alone until the belt slipped on the pulley. The same experiment was then tried with a leather belt of the same width and under precisely similar circumstances, and it was found that the rubber belt greatly economized the power. Repeated experiments showed the same result in the most convincing and satisfactory manner." Certain it is that the demand for these rubber belts from manufacturers and our best mechanics, including the large manufacturing corporations of New England, is very great, for the Company are obliged to run their factory by night as well as by day to supply it.

Another article made extensively by the Company is Steam Packing. Rubber, it is said, is the only substance that can counteract the expansion and contraction of metal and make a joint so tight that steam cannot escape through it. It is made into sheets and plates of different sizes and shapes, or cast into rings or hollow ellipses of all imaginable forms, and is used to pack around the piston-rods, to place between the iron plates in steam pipes, and in fact wherever a joint is formed.

Another article manufactured to a great extent at this establishment is their celebrated "Croton Hose," and hydraulic hose of all sizes from a ¼ of an inch to 8 and 12 inches in diameter. A large force of workmen is employed in this department. The tube is formed by means of long metallic pipes, around which a sheet of carefully-prepared rubber is first neatly folded; but the rubber alone has not sufficient strength to resist the pressure of water, which would swell and finally burst the elastic hose. To prevent this, and give additional strength, the outer covering is formed of webs of strong cloth, saturated and coated with prepared rubber. This is folded carefully around the hose until the requisite strength and thickness are obtained, and it is then finished by covering it with a final sheet of pure rubber. The hose, when formed, is taken to a steam-boiler of great length, where, while still remaining upon the iron pipes, it is heated and cured by a process similar to that before described; after which the rubber is drawn off from the pipe, and it is ready for the market.

Hose designed for steam fire-engines, which this Company manufactures largely, is tested by turning the whole force of the vast water-wheel upon two large force pumps, through which the water is forced into the hose and driven in jets over the factory and high above the summit of its lofty tower. Unless the hose resists this trying test it is not considered fit for market. Besides these leading articles, the Company manufactures a large number of others for household convenience or mechanical purposes,—for instance, carpets for halls, and stairways, and billiard rooms; sinks without joint or seam; door springs that can be adjusted either to hold the door open or to close it; bed springs, spittoons, and clothes wringers;—of which hundreds are made daily. Of their minor manufactures, however, perhaps the most ingenious is the solid emery vulcanite. It is a novel combination of emery and rubber, and used for grinding and polishing wheels, and which is destined to produce a revolution in many workshops where metals of any kind are ground and polished. The soft rubber when combined with emery makes wheels which will cut an inch file in two in a few minutes. The New York Belting and Packing Company own or are the sole licensees under no less than thirty-seven different patents, which secure to them not only the best means and processes and machinery for manufacturing their goods, but also a monopoly of certain branches.

Such is one of the numerous factories that are giving profitable employment to thousands of operatives, and furnishing contributions of the greatest importance in manufactures and the arts. This age has been prolific in wonders, and among them few are more marvellous than the product of the India Rubber factories of America. We desire, however, to place upon record our settled conviction that the application of vulcanized rubber in the useful arts is as yet in its infancy, and that our ingenious mechanics and manufacturers will discover hundreds of new uses for this wonderful "elastic metal."

The Piano Forte Manufactories—Steinway and Sons' Manufactory.

New York is the principal centre in the United States of the manufacture of Pianofortes. There are over fifty different manufactories; and though we believe there are none so extensive and complete as the one that we are about to describe, yet among them are many fine and some large establishments.

The name of Steinway as a manufacturer of Pianofortes has long been a familiar one to the musical artists of Germany. Mr. Henry Steinway, the founder of the immense establishment which strangers from afar now visit as one of the wonders of New York, commenced the business of making Pianos in Brunswick, Germany, nearly fifty years ago; and though during the quarter of a century in which he prosecuted the business he probably did not make as many instruments as his establishment now turns out in a single year, yet he acquired a reputation, and his European career as a master-builder may be said to have been a successful one. When, however, the uprising of the German people for their constitutional liberties in 1848 and 1849, in which he sympathized, proved a failure, he resolved to escape from the despotism that followed the subjection of the "liberal party," and to seek a more congenial field for the free exercise of his genius and enterprise. As a prudential measure he sent his son Charles to America as pioneer and explorer, to report upon the prospects of emigration which the country would be likely to afford to the family. His son arrived in June, 1849, and his report confirming the previous favorable impressions of the father, he followed with the family just one year after. Although possessed of some means, he deemed it advisable before commencing business on his own account to study the routine of manufacture as practiced in American workshops, and he and his sons commenced as journeymen in some of the best manufactories then in the city of New York. The advantages of this thorough training, which rendered them practically familiar with the American and European methods of manufacture, soon became manifest when the products of their skill and handiwork were entered in competition with those of others, even the best makers.

Their first instrument, made in 1853, in a small rear building in Varick street, at once attracted the attention of professional musicians, and at the "National Fair" in Washington, was awarded, by the unanimous vote of the jury, the first premium, notwithstanding there were some twenty competitors from the principal cities of the Union, including most of the names then of established reputation. A demand for their instruments at once sprung up, and a change of location to one possessing more extensive facilities for manufacturing soon became an absolute necessity. The popular favor which rewarded their early enterprise has in this instance manifested none of its proverbial fickleness, but has increased and widened until from one Piano a week they are now called upon to make seven a day. During the last four years we are informed that over twenty first-class premiums have been awarded them by American associations for the promotion of industry and encouragement of talent; and at the late exhibition or World's Fair in London, in 1862, a jury composed of the most renowned musical celebrities of the old world decreed to Steinway and Sons, of the United States, the first premium for "powerful, clear, brilliant and sympathetic tone, with excellence in workmanship, as shown in grand and square Pianos." This was indeed a remarkable triumph that could not have been won except by the exhibition of the most marked, unquestionable and super-eminent excellence. In fact, the superiority of these American Pianos over their European competitors has excited the attention of connoisseurs throughout Europe, and all the principal musical journals in London, Paris, Vienna and the continent noted the fact with astonishment and confirmed the opinion of the official jurors.

It is an axiom that there can be no great mechanical excellence without corresponding merit in the mechanic. Luck, whatever may be its influence in speculative enterprises, has no appreciable place in manufacturing operations. We may not be able to analyze or trace causes in results, but we can safely infer that where there is great success there is also adequate cause for it. One circumstance which has doubtless contributed to the success of this firm, is that all its members are practical Piano makers, and each takes in charge and superintends a special department of the manufacture. Another advantage which they possess is that they are musicians and adepts in the science of music and acoustics, which, combined with their practice, renders them scientific as well as practical workmen. They are also inventors, and have taken out some fifteen patents for new actions and scales. Among their first or earliest improvements was a new reversed bridge, constructed of metal, for improving the treble; a new way of bracing their Pianos by which they could use much thicker strings, thus producing a more powerful tone; an ingenious arrangement in the scale, having the sounding board nearly double as large as that in any other Pianoforte, which of course gave much greater volume of tone.

In 1859 Mr. Henry Steinway Jr. succeeded in overcoming the difficulties which had heretofore been deemed insurmountable in the way of overstringing Grand Pianos. The arrangement of the strings of the lower notes in a tier above others, for the purpose of using larger strings, had been quite commonly adopted in the construction of square Pianos, and a substantially similar system of stringing had been applied to upright Pianos, but owing to the form of the case and arrangement of the key-board and action of Grand Pianos, it had been deemed impracticable if not impossible to apply the principle in their construction. But Mr. Steinway has succeeded in overcoming these difficulties by an improvement which he has patented, and arranges the strings of a grand Piano in two tiers, with the same advantageous results as had been obtained in Pianofortes of other forms, while the bridges are also brought nearer the middle of the sound-board than they are in any other Grand Piano. In the same year Mr. Steinway patented another valuable improvement, the object of which was to permit the use of "agraffes" for the tuning block-bearings of treble strings, and yet to permit the strings to be struck as close as is desirable to those bearings. This was effected by constructing the cast-iron plate which covers or partly covers the tuning block with a projection on its under side, to lap over the edge of and abut against the tuning-block, and in securing the agraffes down from the upper surface of the plate into the projection. Both of these inventions and improvements have been generally adopted by manufacturers abroad, which is significant evidence that they appreciate their value.

The present manufactory of Messrs. Steinway and Sons is one of the largest of its kind in the world. It was erected in 1859, and occupies an entire block fronting on Fourth Avenue, and extends from Fifty-Second to Fifty-Third street. The front on Fourth Avenue has a length of two hundred and one feet with a depth of forty feet. The wing on Fifty-Second and Fifty-Third Streets are one hundred and sixty-five feet in length and forty feet in depth. The whole building is six stories high including the basement. The architecture is of the modern Italian style, with brick lintel arches, brown stone trimmings, and brick cornices. It is very substantially built, the basement-wall being grouted brick two feet thick, the first story walls twenty inches and the upper walls sixteen inches in thickness. The main building covers fourteen city lots, eleven other lots being used for the purpose of seasoning lumber, of which there is a stock of about 2,000,000 feet always piled up on the grounds. In the yard there are four drying houses, each of which is heated by 2000 feet of steam-pipe, and contains about 60,000 feet of lumber, so that there are about 240,000 feet of lumber constantly under the process of kiln-drying.

There are about 400 men constantly employed, who turn out forty-Square and five Grand and Upright Pianos every week.

The machinery is driven by a splendid engine of fifty-horse power situated outside the building in the yard. It was manufactured by the Corliss Steam Engine Company, of Providence, and contains all their latest patented improvements.

All the heavier portion of the machinery is located in the basement. In this room are three large planers, one of which was made expressly for this establishment, and is certainly one of the largest instruments of its class existing, planing the largest Piano tops or bottoms at once. There are also four up-and-down saws and several circular saws, besides turning lathes, etc. etc. These wonderful and powerful instruments are constantly at work shaping the rough plank ready for use in the first floor above, where the bottoms, blockings, wrest planks, and other parts of the case are got up, with the aid of moulding, jointing, and other machinery.

The three stories above are occupied by the case makers, who take all those single parts made below, put them together, and veneer and finish the cases ready to go up to the top floor or varnishing room, where every case remains from three to four months to be thoroughly varnished. On each case making floor there are three large warming boxes constructed of sheet iron and covered with wood, with sufficient steam pipes in them to raise the heat to 200 degrees. The varnishing department comprises the top floor, extending the whole length of the front and side buildings—a length of five hundred and thirty-six feet. From this floor the completely varnished cases are taken one floor lower down in the front building—the sounding-board floor—where the sounding-boards are fitted in.

In the floor below the instruments are strung, and the action and key boards, and the tops, legs, and lyres adjusted and put on. The partly-finished instruments are then taken first to the floor below where the action is regulated, thence to the first floor, where the hammers and the tone are regulated; after which the final polish is put on the cases and the perfect Piano is ready to be sent down to the sales room. This floor also contains the office of the establishment, situated on Fifty-Third Street, through which every person entering or leaving the building has to pass.

In connection with the office is the store room, which contains the actions, felts, hardware, ivory, cloth, pins, wire, etc. used in the interior works of Pianos. Of these materials there is a vast supply always on hand amounting in value to over thirty thousand dollars.

The front basement contains all the iron work, plates and bars, drilling machines, japanning works, and the rosewood veneers. Of the last the stock on hand is rarely of less value than eight thousand dollars

No fire of any kind is used within the building. Every part of the factory is heated by means of steam pipes, 40,000 feet of which line the interior. The wood-heating apparatus is also warmed by steam, which also heats the kilns for japanning, etc., etc.

In the two extremes of the building are placed tell-tale clocks for the purpose of testing the trustworthiness of the night-watchmen. Wires are carried to each floor, and if they are not touched at certain intervals the watcher has neglected his rounds, and the tale is recorded on the faces of the dials.

There are from six to seven hundred pianos constantly in course of construction, and these, in connection with the hardware, machinery, engine, veneers, lumber, etc., etc., represent at least the sum of $400,000, exclusive of the buildings. The cost of the building and ground was about $150,000.

The distance between their Sales Room, on Walker Street, and the up-town factory, is so great, and the need of immediate communication so frequent, that a telegraphic correspondence was found to be necessary. Consequently a private telegraph line has been established between Walker Street and Fifty-Third Street, bringing the two business places into instant communication.

Messrs. Steinway have just erected on East Fourteenth Street, a few doors from Union Square, near the Academy of Music, a splendid marble building, which they are now about occupying for a Piano Ware Room—the upper part being fitted up for a Concert Hall. Like their manufactory, it will stand as a monument of their enterprise, while it is also an ornament to the City of New York.

A New York Sewing Machine Manufactory.

New York is the principal Depot in the United States for the sale of Sewing Machines. Nearly all the manufacturers of the various machines made in New England have warehouses in this city, and the three principal companies have magnificent Sales Rooms on Broadway. Of these the only one having its manufactories in the city is the SINGER COMPANY; and as the history of this Company's machine carries us back to the period when the invention was in its infancy, and has points of general interest, we spare the space necessary to relate it.

Singer's Sewing Machine has a definite date in the month of September, 1850, in a small machine shop in Harvard Place, in the City of Boston. Three persons came together, one of whom offered to furnish forty dollars to pay the expense of constructing a new Sewing machine, the proprietor of the shop agreed to make it for that sum, and Isaac M. Singer, one of the three, undertook to invent it. This agreement was immediately acted upon—the parties interested all laboring continuously until the machine was brought to a working condition, which was accomplished in eleven days. In this machine, for the first time, the Feed Wheel was projected through the surface of a horizontal table; and in this machine was presented, for the first time, a device or permanent arm projecting over the table for the purpose of supporting the mechanism by which the needle was moved and the needle thread properly controlled. Previous to this time a reciprocating arm had been used to hold and support the needle. The new arrangement made it practicable for the first time to enlarge the size of the machine to any desired extent, and to give the machine great solidity and strength, so as to make it available for the heaviest kinds of work and at the same time equally advantageous for the sewing of light fabrics.

In the machine spoken of, baister-pins were retained in the periphery of the feed-wheel, which was a fault in all sewing machines up to that time. It was however soon discovered that pins on the feed-wheel were only an obstruction, and that a roughened surface of the wheel would be equally efficient to move the fabric and yet enable it to be turned in any direction at the will of the operator. The first experiment was tried by fixing a strip of broadcloth upon the periphery of the wheel, and that being found to answer, the wheel itself was serrated or roughened in the same manner as has since been practiced. A patent was soon after applied for, the improvements spoken of including a very simple method of controlling the needle thread by pressing lightly upon the thread with a spring, so as to prevent the thread from tangling under the point of the needle. A patent was obtained by Mr. Singer on the 12th of August, 1851.

The Singer Sewing Machines are remarkable from the fact that the earliest made were good working machines, capable of being used very advantageously. Improvements have been added from time to time, but in their form and general structure they remain much the same as they were originally. The manufacture and sale of these machines have not been interrupted since they were first introduced, and for manufacturing purposes none have been more popular.

The manufactory in Harvard Place, Boston, where the original machine was made, was soon found too small to supply the demand, and it was deemed advisable to transfer the manufacture from Boston to the City of New York. A very extensive shop was fitted up over the New Haven depot, which it was supposed would be amply sufficient to furnish all the Sewing Machines that would be required; but after about a year it was found inadequate, and the machinery and space were doubled.

As soon as it became certain that the Singer Machine would succeed, the proprietors had to defend themselves against an attack under the patent of Elias Howe, Jr. At that time Mr. Howe was known simply as a patentee, and machines of the form described in his patent were nowhere used. It was believed by many that the invention of Mr. Howe, described in his patent, had been anticipated in sewing machines made in the City of New York by Walter Hunt, about the year 1836. The owners of the Singer Machine undertook to defend themselves by this early invention, and proved by numerous witnesses that Walter Hunt did make at least two machines, operating with the needle and shuttle and making the interlocked stitch, which would make seams; but it appeared that Hunt did not apply for a patent for his invention, but sold it to a man named Arrowsmith, who also neglected to apply for a patent, and the machines made by Hunt were broken and abandoned without having been introduced into practical use. The Court held, after a very full investigation, that the prior invention and machine of Hunt were not sufficient to invalidate the subsequent patent of Elias Howe, Jr., and the proprietors of the Singer Machines submitted to the decision and took a license under Mr. Howe's patent.

In the year 1855 a violent litigation arose between I. M. Singer & Co. on the one side, and the Wheeler & Wilson and Grover & Baker Companies on the other. Each of the parties owned numerous Sewing-Machine patents, and alleged that such patents were infringed by the others. Numerous suits were instituted on these patents, and the parties interested finally came together in October, 1856, for the purpose of trying some of them in the U. S. Circuit Court. Singer & Company were the plaintiffs, and so numerous were the points at issue that it was supposed a trial of one of these suits would occupy not less than three months, and therefore a wish was expressed by the Court that the parties would arrange the matters in controversy amicably if possible. Their respective counsel, acting on this suggestion, became satisfied that it would be to the interest of their clients to make a settlement, and an arrangement was thereupon made satisfactory to all—the effect of which was to enable each of the parties to use the patents of all the others so far as necessary in the machines constructed by them, and to make all the patents available for mutual defence against infringers.

In 1857 it was found that the manufactory of the Singer Sewing Machines was not large enough to furnish facilities for making the number required, and besides, it was liable to destruction by fire. On several occasions it had narrowly escaped destruction. For these reasons the firm purchased the premises in Mott Street, New York, and had a permanent iron fire-proof manufactory erected covering four lots of ground, which was strictly fire-proof in all its parts. This is one of the most perfect and most costly buildings for manufacturing purposes ever constructed. In 1859 a further enlargement became necessary, and another manufactory was erected in Delancey Street, five stories in height, and covering thirteen city lots.

Previous to 1859 the Singer Machine was designed principally for use in manufacturing operations, but when it was clearly demonstrated that the sewing machine would become an ordinary household instrument, the firm determined to introduce a modification of their original machine, combining its substantial working qualities with lightness and delicacy of form and construction, to fit it for the light work of the family, and they have now machines that are adapted for sewing the coarsest leather and the finest cambrics.

In 1863 the copartnership of I. M. Singer & Co. was dissolved, and succeeded by a joint-stock company known as The Singer Manufacturing Company, of which INSLEE A. HOPPER, Esq., is now President.

The Leather Manufactures—Hoyt's Belting Factory.

New York has more capital invested in the manufacture of Leather, and a less number of Tanneries within its limits, than any other American city. In the First Volume of this History some account was given of the early Tanneries for which "Beekman's Swamp" was once noted, but of them all, only one remains. As the city grew, and ground became valuable for building purposes, the vats were filled up, and manufacturers sought new localities, principally in the interior counties of the State and in Western Pennsylvania, in the vicinity of the oak and hemlock forests, it having been found cheaper, as one tersely expressed it, to carry the hides to the bark than the bark to the hides. Some of the interior tanneries are immense establishments, having several hundred vats, and the capacity to tan 100,000 sides annually.

New York has not only more capital invested in the manufacture of Leather than any other city in America, but does a larger trade in Hides and Leather than any European city. The importation of hides into the city of New York, and its sales of leather, exceed those of London, Liverpool and Paris combined. In 1863 the imports of hides at the port of New York amounted to 1,770,578 hides and 866 bales of Calcutta stock; and for five years, from 1859–63 inclusive, to 8,835,043 hides and 6,153 bales. There are over a hundred firms, including the manufacturers of Morocco, engaged in the Leather trade in New York City, one of whom has thirteen Tanneries, and there are two or three firms whose sales exceed three millions of dollars annually.

In choosing one firm to represent all, *ex uno disce omnes*, we shall select that of HOYT BROTHERS, not because they are the largest, but because, besides being Tanners and Curriers, they are also extensive manufacturers of Belting. This firm have three tanneries—two in Ulster County and one in Sullivan County—and besides these, "stock" tanneries, which are owned by other persons. In the processes of tanning they avail themselves of all the aids of modern science to hasten chemical combinations which experience has proved to be practicable, but they find that it still requires from six to eight months to make good leather. From the tannery, the Leather is brought to the Hide House on Eldridge Street, near Houston, in New York City, where it undergoes the process of currying. The upper part of this extensive establishment is occupied as a manufactory of Belting. In this manufacture, which has become an important branch of their business, they adopt methods not generally practiced in other similar establishments. Contrary to the usual custom, they stretch the leather before cutting, placing it in strong clamps or jaws and applying immense power. After it has been subjected to the greatest possible tension it is cut to the requisite widths with a knife moved by a treadle, when it is again stretched, so that if there be any remaining elasticity in the leather it is extracted. After being thus stretched a second time, the ends of the various pieces are squared and chamfered, or skived so that on placing the ends of the two pieces together the parts lapping will not be thicker than the other parts of the belt. A cement is now placed on the skived or chamfered part, and patent countersunk rivets are passed through as an additional strength to the joint, while double rivets are so placed as to cross the chamfered or skived parts, to give still further security, and to bridge over the ends of the joints and prevent them from being turned-up by the friction of the pulley. This improvement also allows the ends of the laps to be made thick or thin at pleasure without detriment to their strength, and does not render cement necessary to make a strong or durable joint for wet or damp places. The patent Rivet and Burr which this firm have the exclusive right to use, leaves a smooth surface on both sides of the band, and the belt may be used with either side to the pulley without reference to the inserted rivets.

This Manufactory of Belting was originally established by Mr. Frederic Wood, and after his decease passed into the hands of Rees & Hoyt, who were succeeded by the firm of Hoyt Brothers. These gentlemen have had a long experience as Band Makers, and have the advantage of established arrangements which enable them to obtain a supply of hides adapted to the purpose, every one being closely examined before it is sent to the tannery. About 40 men are employed in the Belting Manufactory, and the sales of manufactured belts amount to hundreds of thousands of dollars annually.

Ketcham's Planished Ware Manufactory.

In no branch of manufactures has a greater revolution been effected within a few years by the introduction of machinery, than in the Tinman's art. Formerly all the numerous articles included in the term Culinary and miscellaneous Tinware, were made by a few simple tools in small shops. Now, by the aid of dies, presses, and lathes, the separate parts or the whole, according to the degree of complexity of an article, are at once struck up in the required shape, plain or ornamented, with devices as may be desired, and the work of the Tinman is reduced to the simple act of soldering or uniting the several parts. In no American city are the establishments in this branch so large as those in New York and its vicinity.

One manufactory that we visited, that of E. D. Ketcham & Co., located in Brooklyn, is built in the form of a hollow square, five stories in height, and covers a lot 125 by 100 feet. The buildings were erected expressly for the purposes for which they are used, and are divided into fifteen separate departments. The plain sheet of tin is first taken to the Stamping Department, where, by means of machines driven by steam power, it is given the size and form of the articles desired in an inconceivably short space of time. This firm, by long and patient experiments, have succeeded in perfecting machinery to stamp Tin Pans of any size or depth from a single piece of Tin without soldering or moulding. This process is not by any means a new one, but we believe Messrs. Ketcham & Co. were the first to succeed in producing stamped or solid articles of Tinware of any required depth. Pans made in this way are heavier, more durable, and cheaper than the old style. From the Stamping Department the articles are taken to the Planishing Room, where by means of steel rollers, driven by steam power, they are burnished and made to assume an appearance almost equal in brightness to silver. Mr. William Taylor and Charles Hodgetts, who have the supervision of this entire manufactory, are accredited with having been the pioneers in this country in the manufacture of Planished Tin Ware.

The other departments include rooms for Cutting, for making up various articles of plain Tinware, for manufacturing Sheet-iron goods, for Japanning, Ornamenting, etc.

The Store of the firm, situated at 289 Pearl near Beekman Street, in the City of New York, is also five stories in height, and has a front of 27 feet by 100 feet in depth. The first floor is appropriated as a Sample Room, and to the Counting Houses, which are presided over by the head of the firm, who is a merchant of twenty years' experience in the business. The upper floors are used as Salesrooms and for the storage of goods of their manufacture. To enumerate all the articles in a stock so varied and extensive, including Japanned, Planished, and unfinished wares, plain Tinware, Britannia ware, Plated and Hollow ware, Tinmen's Tools and Machines, would be a task almost as serious as the taking an inventory of a Yankee Notion house; but the firm seem to have accomplished it in a classified and illustrated Pamphlet Catalogue which they have prepared for the convenience of purchasers.

A New York Billiard Table Manufactory.

New York has the most extensive Billiard Table Manufactory in the world. Neither England nor France has one of equal importance, and both Englishmen and Frenchmen concur in awarding superiority to Americans in this branch of manufactures. This is peculiarly a New York manufacture—for though other cities make Billiard Tables to supply a local demand, New York is the leading market, supplying not only the United States, but foreign countries. There are several manufactories of this description in New York City, but the largest and principal one is located on Crosby Street between Spring and Broome. It has a front of 75 feet, a depth of 100 feet, is five stories high, and has a floor area of 30,000 square feet. Each floor is devoted to a distinct department of the business—the whole being most admirably and systematically arranged. Entering the basement, which is used exclusively for marble work, we find the beds for Tables (of marble and slate) in course of formation, and undergoing the polishing process. On the first or main floor is the Exhibition and Sales Room, in which there is always a stock of some two hundred Tables for purchasers to select from, in every kind of material, including rosewood, black walnut, mahogany, satin wood, birch, California laurel, etc., and which for exquisite beauty of workmanship cannot be excelled. On the second floor is the Fitting Room, where the various parts of the Tables are put together—the division of labor in this establishment being so adjusted that each department has its own exclusive artisans, thus securing comparative perfection in all. The third floor is filled with machinery for planing, sawing, tenoning, mortising, and moulding, the motive power of which is derived from an engine of twenty-six horse power. The next floor is devoted to a steam apparatus for Veneering, and to the Ivory department where the Balls are turned.

The difficulty of turning Billiard Balls so to make them perfectly round and true, or in other words a sphere, has until lately been regarded as insuperable. Heretofore the universal method of turning balls was in a common lathe, with, for the most part, hand tools. This, as every mechanic knows, was a tedious process, as it was necessary to take the ball out of the lathe very frequently for readjustment; yet notwithstanding all this pains-taking it was almost impossible for the most skillful adept to produce a perfect sphere. This great mechanical difficulty has at length been overcome; for by a process patented by Messrs. Phelan and Collender, and invented by a gentleman in California, all kinds of spheres, from billiard balls to cannon balls, can be turned perfectly round with very little more trouble than placing the raw material in its place after the machine has been properly adjusted to size.

On the fifth and highest floor is the Varnishing and Finishing Room, where the Tables receive that exquisite polish which renders them so attractive as articles of "household furniture." Connected with this department are numerous rooms, used for painting, inlaying, cushion-making, etc.

The statistics of this Manufactory are especially interesting. Employed in it, directly and indirectly, are one hundred and fifty workmen, and two hundred Tables are constantly in course of construction. The value of the Lumber used, consisting of ebony, ivory, rosewood, mahogany, black walnut, ash, birch, satin wood, and California laurel, is annually over $30,000; of ivory for Billiard Balls, $15,000; Billiard Cloth, which is the fine green cloth manufactured exclusively in Belgium, $20,000; India Rubber, $20,000; besides Silk Trimmings, Brass Screws, etc.

American readers will anticipate the announcement that the proprietors of the establishment alluded to are Messrs. Phelan & Collender. These gentlemen are more enterprising than most of the New York manufacturers, and do not hide their light under a bushel. They have made their names so familiar to the public, and their manufactory so well known, that it is impossible to write a comprehensive account of the manufactures of New York without noticing it. The senior partner, Mr. Michael Phelan, is the leading American authority in billiard playing, and is also the inventor of the most important improvements that have been made in the construction of Tables. His Combination Cushions, patented in 1855, have effected a revolution not only in the manufacture of Tables, but in the game itself. Instead of being a game of doubt and uncertainty, as formerly, it is now one of judgment, practice, and mathematical calculation, calling into requisition the intellectual as well as the physical powers of its votaries. Mr. Phelan, moreover, is entitled to a still more honorable distinction for his unremitted efforts to elevate the game in public estimation by divesting it of those gambling associations which at one time were regarded as inseparably connected with it, and introducing it as a social and family amusement. The demand for Billiard Tables for private use is now far greater than that for public rooms, and even the present resources of the establishment we have mentioned, extensive as they are, seem inadequate to keep pace with the requirements made upon it, for the firm are about erecting in the immediate vicinity of the manufactory we have described another and larger building, having a front of 112 feet. We may add, however, that their market is by no means confined to the United States, for their Tables have been sent to France, Italy, Russia, China, Japan, Turkey, the Canadas, California, Cuba, South America, and even to the Sandwich Islands, and the demand from these countries is said to be steadily and constantly increasing.

These establishments may be said to be exceptional, and peculiar to New York—no other city has others precisely like them. Of this class too, and in a still more eminent degree, are the Printing Press manufactories of R. Hoe & Co., who are the makers of the mammoth machines upon which not only the principal American daily Newspapers are printed, but many of the leading journals in England. In the manufacture of Printing Presses, New York is pre-eminent, there being, besides Hoe's Manufactory, four others—Gordon's, Campbell's, Taylor's, and Degener's. The Type Foundries in New York are also numerous and extensive. There are four large foundries, those of George Bruce, James Conner's Sons, Farmer, Little & Co., and Hager & Co., and several smaller ones. The Wood Type Manufactory of John G. Cooley is now the largest of three in the United States. During several years Types have been set and distributed by Machines in the extensive Printing Office of John F. Trow; and recently a Company has been organized in New York for the manufacture of a new Type-Setting Machine, invented by Alden. Printing Ink is also made more extensively in New York than in any other city. The establishments of John G. Lightbody, H. D. Wade & Co , and Geo. Mather's Sons, make considerably more, we are convinced, than the census-marshals have returned as the product of all. All the Bank Note Engraving companies—the American, National and Continental—have their principal Engraving and Printing Rooms in New York, which during the last two or three years have been scenes of unusual activity in supplying the Government requirements for Bonds, Notes, and Currency. In the arts of Engraving on Steel, Wood, and Stone, Lithography and Photography, the New York establishments are certainly not surpassed, if equalled, by any in the other cities. Recently a Company has been organized for Photographing on Porcelain, by which an accurate portrait, or any vignette or landscape, can be transferred to a Vase or Cup, or any China article. Various leading articles of Stationery are made very extensively, for instance—Envelopes by Geo. F. Nesbitt & Co., Berlin & Jones, Wm. P. Lyon & Whitemore, and Samuel Raynor; Writing Inks by Thaddeus Davids & Co., E. R. Durkee & Co., and Jesse G. Keys; Gold Pens by Morton, Foley, Johnson, Warren & Co., and others; and Printers'.and Visiting Cards by Smith & Peters, Lawrence, Cohen & Co., and others. A Company has recently been organized for manufacturing Playing Cards with national emblems, a Colonel occupying the place of the King, the Goddess of Liberty the Queen, and a Major the Jack.

Clothing is made largely in Cincinnati and in Boston, but New York takes precedence of all American cities. There are about one hundred firms engaged in this manufacture, who have a capital of at least ten millions of dollars. The number of persons in the city and vicinity who are supported by this trade is stated at 95,000, one-half of whom are employed on Government work and in retail stores, and the other half by the wholesale trade, which pays to them annually in wages about ten millions of dollars. The houses of Brownings, Button & Kimball, Kirtland, Bronson & Co., John T. Martin & Brothers, Longstreet, Bradford & Co., Bernheimer Brothers, Devlin & Co., Wm. Seligman & Company, James Wilde, Jr. & Company, Thomas Chatterson, Payan & Carhart, Brooks, Brothers, are probably the largest in the United States. Shirt Bosoms to the number of three thousand dozens are made daily in the city. One establishment turns out an average of eight hundred dozen Shirts per week, using 400 sewing machines, and employing 800 females. The Mantilla and Cloak trade is said to amount to three millions of dollars per annum. Sewing machines are largely used in this manufacture, the operatives being paid about six dollars per week, and hand-sewers four dollars. Of Hoop Skirts, it is estimated that as many as sixty thousand of the various sizes are made each day during eight months of the year. The largest manufacturers are the firms of J. I. & J. O. West, Douglass & Sherwood, L. A. Osborn, W. S. Thompson, Langdon & Company, Austin Kelly & Company, Dunbar & Barnes, and Samuel H. Doughty. There is also one firm (Burt & Terhune) who make Boots and Shoes by machinery on an extensive scale. All the operations connected with the manufacture—cutting out the soles and heels, sewing, and pegging—are performed by machines designed especially for the purpose. One hundred men will turn out with these machines as much work as four hundred without them. About 500 pairs of Boots and Shoes are produced daily in this establishment.

Ship, Army and Navy Bread and Crackers, are made to a very large extent in New York, some of the bakeries consuming two hundred barrels of Flour per day. The leading firms in this branch are Ephraim Treadwell's Sons, Young, Davidson & Co., John T. Wilson, Charles T. Goodwin, Robert C. Scott, Erastus Titus, and the United States Patent Baking Company. A patent Aerated Bread is made largely by Thomas S. Ollive. Another *quasi* edible, Finecut Chewing Tobacco, is made principally in New York; the brands of John Anderson & Co., E. Goodwin & Brother, Peter Lorillard, John Cornish, A. H. Mickle & Sons, and C. H. Lilienthal, are favorites in all parts of the United States. The Distilling and Rectifying of Liquors is also a prominent pursuit, employing a large capital. The Distilleries of Lowber, Ostrom & Co., Schenck, Rutherford & Co., Trott Brother & Co., Hoffman & Curtiss, Rogers & Stanton, Dudley P. Ely & Co., and the Rectifying establishments of Bach & Puffer, Coolidge & Young, J. C. Dayton & Co., and Johnston & Lazarus, and the Alcohol and Camphene Distilleries of J. H. Brundage & Co. and J. A. Webb & Co., are among the largest in the United States. There are several important Breweries of Ale and Beer, but their market must be abroad, for the leading hotels and restaurants of New York professedly sell none but Philadelphia and Albany Ales.

The Soap and Candle Makers of New York are among the most enterprising of her manufacturers. Believing, as Leibig asserts, that the quantity of Soap consumed by a nation is no inaccurate measure whereby to estimate its wealth and civilization, the firms of J. C. Hull's Sons, Colgate, Enoch Morgan's Sons, Babbitt, Hay, Pyle, Brown, and Fay, are doing their utmost to place America in the first rank of the wealthy and highly civilized nations of the globe. One of these houses (B. T. Babbitt) has a gigantic Soap Kettle 63 feet in circumference and 15 feet deep (said to be the largest in the world), which has a capacity to make 250 tons of curd soap at one time. The cost of the grease alone for a single charge is about $20,000. Duryea's Starch and Maizena, Andrew's Saleratus, and Hecker & Brother's Farina, are articles equally well known to the grocery trade.

To save Druggists the trouble of preparing prescriptions, a number of firms provide them with select medicines already prepared. Brandreth's Pills, Mrs. Winslow's Soothing Syrup, Drake's Plantation Bitters, Radway's Ready Relief, and Tarrant's Seltzer Aperient, are popular New York remedies for the ills that flesh is heir to.

All articles of luxury, Gold and Silver Plate, Silver and Britannia Ware, Artificial Flowers, richly Carved Furniture, are made largely in New York, as one would expect in a city so devoted to luxury and so fond of display. There are two hundred manufacturers of Confectionery, including some extensive concerns—as for instance those of Stewart & Co., Henry Maillard, Ridley & Co., Martin Brothers & Co., Ernest Greenfield, and Staudinger Brothers & Co. There are several manufactories of Paper Hangings, the principal ones being those of J. & M. Christy, M. A. Howell & Co., Whiting & Co., and Jones & Smith. The firm of Haughwout & Co. employs about 100 men in decorating the various articles of China and Porcelain ware which they import in the *bisque* state.

The Ornamental branches of the Iron Manufacture are largely and successfully prosecuted. The foundries of James L. Jackson & Brother, J. B. & W. W. Cornell & Co., M. M. White & Co., George R. Jackson, Burnet & Co., McFerran & Vanderbeck, Hutchinson & Wickersham, Badger's Architectural Iron Works, and the Piano Plate Manufactory of Thos. Shriver & Co., are distinguished for the fineness and beauty of their castings. Very fine Stove Castings and large quantities of Iron Pipe are made at the J. L. Mott Iron Works at Motthaven, and Furnaces and Heating Apparatus are made largely by Richardson, Boynton & Co., Culver, Simonds & Co., and others. Safes are made to a large amount by Herring & Co., Valentine & Butler, and other well-known firms.

The manufacture of Saddles and Harness is also an important business in New York City. The late demands of the Government for the Cavalry service has contributed to add to its importance, though the firms of Betts, Nichols & Co., Lacey, Meeker & Co., W. H. Bassett & Co. (now Norton & Bassett), J. E. Condict, and Morrison & Hurd, have for many years occupied a leading position in the trade. The manufacture of Paints and Colors is another branch in which there are establishments of great importance. The White Lead Works of the Union, Atlantic, and Brooklyn White Lead companies, are probably the largest in the country. The Paint Manufactories of D. F. Tiemann & Co., the Varnish Manufactory of Wm. Tilden & Nephew, the Dyewood Mills of Partridge & Harwey, the Oil Mills of T. & G. Rowe, H. J. Baker & Brother, and the Judd Linseed and Sperm Oil Company, are notable establishments. But while in some branches of manufactures there may be said to be almost a redundancy of fine establishments, there are others of scarcely less importance in which there is a singular deficiency. In the manufacture of Textile fabrics, for instance, we do not know of a single important establishment except the Carpet Manufactory of E. S. Higgins & Co. The Chemical manufactures are represented principally by the establishments of Martin Kalbfleisch and Charles Pfizer & Company. In Brooklyn and Jersey City there are a few Glass works, but the manufacture has not taken deep root. The large Plate Glass Manufactory established in Williamsburg about ten years ago has ceased operations. One New York firm, Messrs. Cooper & Belcher, have a very important manufactory in Newark, N. J., where they make what is called "Etched Enamelled Glass with Clear Ornaments," and "Flocked Enamelled Glass," and are the principal manufacturers in the United States of these articles in large sheets. They have also special facilities for bending Plates for the purpose of fitting them for bow-windows. The manufacture of Caps is an extensive business in New York, but nearly all the Hats sold by the Wholesale Trade are made in Newark, New Jersey, and Danbury in Connecticut. The two principal establishments in this branch in New York are the Hat Body Manufactory of H. A. Burr & Co., who own valuable patents, and the Hat Factory of James H. Prentice & Co. in Brooklyn, which is one of the largest in the United States.

There are two companies extensively engaged in the manufacture of Firearms—the "American Firearms Company," capital $500,000, and the "Starr Arms Company," whose Armory is at Yonkers, where they employ 600 men in making Revolvers, Pistols, and Breech-Loading Rifles.

In the upper part of the city there is a company engaged in Planing and Polishing Stone by machinery. Each machine will plane the face of a stone slab 4 feet long and 2 feet wide in seven minutes. The cutters can be used for planing from 300 to 400 square feet of freestone surfaces, and about 150 square feet of granite, without being ground. The apparatus for polishing, which consists of a flat circular disc of soft iron made to revolve horizontally, will polish about 400 square feet of surface in a day of ten hours.

Besides those that have already been alluded to, we might mention among the important manufacturing establishments of New York, the Brass Manufactory of J. Hoppock, the Gas Fixture and Chandelier manufactories of Archer & Pancoast and Warner, Miskey & Merrill, the Lead Pipe Manufactory of Thomas Otis Leroy & Co., the Umbrella Manufactory of Isaac Smith's Sons & Co., the "Greenwich Pottery" of Washington I. Smith & Co., who make what they call Vitrified Ironstone and Double-Glazed Drain Pipe, the Omnibus and Car Manufactory of John Stephenson, and last, but not least, the Melodeon Manufactory of Carhart, Needham & Co., which is remarkable for its fine machinery and the amount and variety of its labor-saving devices.

Brooklyn contains a very important Navy Yard, which covers a considerable extent of ground, and also has the most capacious Dry Dock in the United States. Vessels of the largest size can be completely docked, and the water pumped out in about four hours. The quantity of water to be removed is said to be 610,000 cubic feet, which is done by a condensing engine with a fifty inch cylinder, twelve feet stroke and thirty-two feet beam. The cut-off motion is self-adjusting, so that more steam is admitted into the cylinder as the height to which it has to pump the water increases. The engine works two draining pumps, each sixty-three inches in diameter, having eight feet stroke, one being connected to each arm of the beam. The whole cost of the dock and its appendages is stated at two millions of dollars.

In most American cities there are merchants who call themselves manufacturers: in New York there are manufacturers who prefer to be regarded as merchants. The predominance of foreign commerce has so far vitiated public sentiment that some consider the office of the merchant more honorable than that of the manufacturer, or, in other words, that it is more respectable to peddle others' wares than to create. Were the manufacturers of New York animated by the *esprit du corps* that distinguishes the manufacturers of New England and Philadelphia, or were the majority as enterprising as a few of their own number, New York would be known as a great manufacturing as well as a great commercial city.

MANUFACTURES OF NEWARK.

Newark, New Jersey, nine miles from New York City, on the railroad connecting New York and Philadelphia, is largely engaged in manufacturing, especially Clothing, Hats, Jewelry, Saddlery and Harness, Trunks and Carpet-bags, Leather and various fabrics of leather. It was here that the first manufactory of Japanned Leather in this country was established. In 1860, according to the census returns, Essex County had a capital invested in manufactures of $13,495,305, by 769 manufacturing establishments, who employed 15,825 males, 5,908 females, and produced a value of $27,706,044. About three-fourths of this amount was produced in Newark. The principal manufactures were:

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of Product.
Brewing	16	$578,000	$371,017	165	......	$833,875
Boots and shoes	55	163,440	276,844	690	146	583,970
Brass founding	8	25,660	43,645	31	......	68,750
Coach lamps	3	26,000	29,960	39	......	57,000
Chemicals	1	89,000	135,000	49	......	228,000
Carriages	34	326,125	289,058	714	10	796,415
Cement	1	300,000	87,000	250	......	255,000
Clothing	42	1,147,600	1,452,170	1555	3045	2,624.252
Coffee and spices	3	28,500	71,202	14	......	92,200
Drugs	1	18,000	50,000	4	......	90,000
Edge tools and cutlery	16	122,700	100,170	242	......	273,725
Fire arms	1	32,000	18,000	60	......	50,000
Hats	23	544,800	974,534	1196	406	1,757,878
India rubber goods	1	200,000	135,000	60	70	400,000
Iron founding	6	121,000	176,510	106	......	276,500
Jewelry	21	726,500	694,465	718	71	1,341,000
Leather	14	217,800	519,781	169	......	694,022
Looking glass and picture frames	5	38,100	47,631	37	......	69,000
Morocco	3	105,000	254,900	138	19	366,000
Machinery	19	405,300	142,422	385	......	760,250
Malleable iron	6	118,000	62,232	200	......	198,500
Ornamental glass	3	28,000	19,215	28	3	72,060
Paper	3	64,000	68,307	28	......	104,882
Patent leather	9	912,000	1,224,675	720	......	1,797,000
Registers and ventilators	1	30,000	......	30	......	80,000
Saddlery and harness	24	1,224,100	758,320	1033	33	1,418,850
Sashes, doors, and blinds	6	73,200	71,550	126	......	143,350
Spokes, hubs, wheels, etc.	8	116,500	97,714	121	......	190,139
Springs	2	45,000	38,420	48	......	79,000
Saddlery hardware	34	288,600	314,365	779	69	698,150
Soap and candles	2	65,000	93,750	20	......	117,000
Stair rods	2	66,000	47,585	38	5	86,400
Straw hats	1	20,000	60,000	25	60	104,000
Trunks and carpet bags	13	314,500	474,850	665	117	929,000
Type metal	1	50,000	50,040	6	......	66,000
Trunk rivets	2	45,000	20,025	130	23	58,500
Tin, sheet iron, and copper	12	101,000	103,860	131	......	208,850
Varnish	8	155,250	194,956	24	......	347,000
Zinc, oxide of	1	1,200,000	98,000	110	......	165,000

MANUFACTURES OF PATERSON.

Paterson, thirteen miles north from Newark, is the next largest manufacturing town in New Jersey. It had in 1860, according to the census returns, 123 manufacturing establishments, with a capital invested of $3,403,700; employed 3,523 males and 1,668 females; and produced a value of $5,939,873. The principal manufactures were as follows:

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Bleaching and dyeing	4	$218,300	237	44	$275,690
Carpets	1	60,500	60	75	98,800
Coffee and spices	1	40,000	13		55,000
Cotton goods	11	683,000	267	629	874,991
Flax and hemp	1	200,000	67	94	140,000
Forging	1	110,000	45		160,800
Hosiery	1	250,000	100	70	290,000
Lampwick	1	40,000	31	22	75,000
Locomotives (1)	3	600,000	1230		1,230,000
Machinery and steam engines	8	310,000	712		639,512
Musquito netting	1	40,000	32	55	90,070
Paper (2)	3	245,000	98	69	374,216
Silk—sewing, etc. (3)	4	153,000	112	478	846,500
Soap and Candles	2	11,000	8		63,300
Tinware	5	32,200	47		51,650
Table covers, etc.	13	23,350	68	6	41,318
Wire drawing	2	3,000	41	17	63,600
Woolen goods and yarn	2	40,000	33	12	100,000

Besides these, there was one manufactory of Belting, two of Bobbins and Spools, three of Bolts, etc., one of Braid, one of Buttons, two of Cabinet Ware, one of Wax Candles, two of Carriages and Carriage parts, one of Chair Frames, two of Cigars, one of Clothing, one of Confectionery, one of Copper work, one of Felt, two of Flour and Meal, one of Harness, one of Hoop Skirts, two of Leather, one of Paints, one of Printers' Rollers, two of Sash, Doors, etc., one of Spindles, one of Umbrellas, six of Wagons, and two small Ale and Lager Breweries, besides the usual number of Blacksmiths, Boot and Shoe makers, etc.

(1) Danforth, Cooke & Co. manufacture about sixty Locomotives a year, besides large quantities of cotton machinery, for which they are celebrated.

The Rogers Locomotive Works, established by Thomas Rogers, in association with Morris Ketchum and Jasper Grosvenor, of New York, employ 720 men, and produce Locomotives and other machinery to the value of over $750,000 per year.

(2) The "Ivanhoe Mills," at Paterson (H. V. Butler & Co., proprietors) are reputed to be the finest and most complete establishment in the United States for the manufacture of Paper.

(3) There are now ten concerns engaged in the manufacture of Silks in Paterson, which has become the Macclesfield of America.

John Ryle, the pioneer in this branch of manufacture, employs 800 hands, and makes

MANUFACTURES OF TRENTON.

TRENTON, the capital of the State of New Jersey, had 203 manufacturing establishments, that in 1860 employed a capital of $2,347,755, and 2,388 male and 1,914 female hands, yielding products valued at $4,243,369. The leading manufactures were Bar Iron, Rails, etc., value $852,694; Machinery, Steam Engines and Iron Castings, $349,370; Paper, $480,000; Hosiery, $461,712; Flour and Meal, $371,676; Woolen goods, $125,000; Cotton goods, $55,000; Earthenware, $100,900; Fire Brick, $45,000; Clothing, $127,840; Coffee and Spices, ground, $110,512; Wire Rope, $70,000; Soap and Candles, $56,100; Stone Pipe vitrified, $50,000; Marble work, $69,672; Cars, $40,000; Cigars, $64,968; Agricultural Implements, $36,850; Anvils and Vises, $38,300; Carriage Shafts, etc., $35,000; Cordage, $22,500; Leather Belting, $24,000; Lumber sawed, $40,000; Sash, Doors and Blinds, $43,120.

Trenton had also manufactories of Boots and Shoes, Brass Cocks, Brooms, Brushes, Cabinet Ware, Hats, Horse Nails, Knitting Machines, Preserved Fruit, Saddlery and Harness, Saws, Skins, Tinware, Springs and Belts, etc.

not only Sewing Silks, for which he has long been distinguished, but woven silks, the fabrics being principally designed for coat and other linings. He has about 30 looms in operation.

THOMAS N. DALE & SON employ 185 hands, and have fifteen looms, including two of the Jacquard style, engaged in making narrow Braids of various patterns, and 38 braiding machines on Silk and Mohair, about half of them making round Cords.

E. WALTHER & CO. have seven power looms, four of them Jacquard's, and 25 operatives, engaged in weaving Silk Ribbons, Neck Ties, and other fancy articles.

THOMAS RAWSON has four handlooms and seven operatives employed in weaving plain goods.

E. B. TILT & SON have about 55 operatives employed in making Tram and Organzine; their factory is said to be the only one in the country devoted *exclusively* to the manufacture of this description of Silks.

LEWIS R. STEELE and JOHN O'NEILL & SONS employ each about 60 hands in making Tram, Organzine, Machine Twist, Sewing and Floss Silk.

HAMIL & BOOTH have about 150 operatives employed in making Sewing Silks, Embroidery Silks, Tram, Organzine, etc.

The other two Silk Manufactories are those of B. E. TILT & SON (under the management of P. Ryle), who employ about 100 hands; and Mr. E. SAUNDERS, who employs 75 hands in making the usual varieties.

The total number of employees in the Silk Factories at Paterson is 1025, three-fourths of whom are females, and to whom about $175,000 are paid annually in wages.

MANUFACTURES OF ALBANY.

ALBANY, which is the capital both of the State of New York and of Albany County, differs from most of the State capitals in being a manufacturing centre of considerable importance. According to the latest census returns, there were in the county five hundred and ninety-four manufacturing establishments, having an aggregate capital of $9,534,079, and which employed 8,032 males and 3,671 females, and produced a value of $16,585,025. This however included the large cotton and woolen mills, and hosiery and other factories of Watervliet and Cohoes; and deducting them, it would leave for the City of Albany 337 establishments, with an aggregate capital of $5,501,119, employing 4,084 males, 2,516 females, and producing a value of $9,586,314. The principal manufactures, according to the census returns, which however are only approximately accurate, were the following:

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Agricultural implements (1)	4	$85,000	102		$214,060
Alcohol	2	260,000	60		950,000
Bricks	10	127,500	202		106,600
Brooms	13	22,300	159		57,664
Cabinet ware, chairs, and bedsteads	15	248,250	287	10	363,050
Carriages	11	97,400	222		211,740
Cigars	17	67,200	200		221,066
Clothing	46	326,500	459	855	713,912
Coffee and spice mills	2	40,000	22		51,500
Cotton goods	5	1,400,800	612	940	1,937,500
Drain tile	3	26,000	50		35,000
Edge tools	2	231,000	320		269,200
Fire brick	1	50,000	26		50,000
Flour and meal	22	257,000	75		823,170
Hats	10	73,000	90		261,200
Hosiery	8	802,000	865	1296	1,099,985
Iron founding	3	20,000	83		44,900
Leather	4	40,700	17		65,611
Linseed oil	1	40,000	15		70,000
Machinery and steam engines	8	$275,000	182		$205,900
Malting	9	510,800	68		561,000
Malt liquors	13	641,000	241		894,221
Paper	4	62,000	55	6	67,494
Patent medicines	2	6,300	5	6	76,100
Pianos	2	120,450	102		126,400
Planed lumber	4	140,000	237		861,075
Saddlery and harness	14	30,100	88	20	83,700
Soap and Candles	5	32,600	14		110,485
Stove founding	7	1,012,000	840		1,088,700
Woolen goods and hosiery	13	964,000	582	1421	1,616,180

(1) We believe that but one of the firms that were engaged in making Agricultural Implements in Albany in 1860, remains unchanged, namely, that of WHEELER, MELICK

The Albany Stove Foundries.

Albany and Troy have long been prominent centres for the manufacture of Stoves. The business as at first conducted, consisted in simply putting together the castings which were made at other places, generally at blast furnaces in New Jersey, near Philadelphia. The early castings were of great thickness, and, compared with those of the present day, were rough and imperfect.

Besides the well-known Franklin stove, for parlors, the first made was a box-stove, and then the oblong plate stoves, such as are yet in use to some extent for heating school houses and churches. The first advance toward a Cooking Stove was making the last-named with an oven; and the first that deserves the name of a Cooking Stove was an oblong affair having an oven running the whole length, the door of which was in front and directly over the door for supplying fuel—and having also a boiler-hole and boiler on the back part of the top near the pipe. Then, a stove similar in arrangement, with swelling or elliptical sides, was made, generally called the nine plate stove, but in Albany and Troy it was known as the Philadelphia stove.

About the year 1812, cooking stoves were made at Hudson from patterns made by a Mr. Hoxie, who was the first to elevate the fire-box above the bottom. This improvement was patented, and was sustained in suits against parties who in any way elevated the fire from the bottom. In Hoxie's cooking stove the fire was made above and upon the oven, and he was the first who made any stove in which the flame was made to descend from the top to the bottom of the oven.

& Co., who have been established there since 1849. They are the successors of A. & W. C. Wheeler, originally established at Chatham, New York, and who, it is said, built the first successful railroad, or endless chain horse-power of single gear, now so extensively used in driving threshing machines and sawing wood for railroads. It was patented in 1836. The firm at the present time have very extensive works, provided with all the most approved labor-saving machines, including some which are not in use in other similar manufactories. A mortising machine, invented by one of the firm, has, it is believed, no superior for rapid and effective work. Their manufactures include, besides the usual agricultural machines, a number of special and patented articles in extensive demand. Their *Combined Thresher and Winnower* is one of the best agricultural machines ever invented, and that it is appreciated by the farming interest is evidenced by the fact that it has been sold in nearly every State in the Union, including California and Oregon.

The manufacture of Tile for draining land is carried on largely in Albany. The statistics of this branch have evidently been underrated by the census-takers. The "Albany Drain-Tile Works," of which C. & W. McCammon are proprietors, is probably the largest of its kind in the United States. All descriptions of Drain Tile are made by them, including round tile from 1¼ to 2¼ inches, horse-shoe tile from 2½ to 7½ inches rise, and sole tile from 2 to 6 inches rise. This is a very important and well-conducted establishment.

In 1815, William T. James, of Lansingburgh, afterward of Troy, made the stove known as the "James' Stove," which not only continued a leading cooking stove for nearly a quarter of a century, but may yet be seen on board of small Eastern coasting vessels, where, being cheap and durable, it supplies the place of a caboose. James' stove is probably better known as the "Saddle-bags Stove." James & O'Connell opened a retail stove store in Troy as early as 1816.

Perhaps no name is better known, not only in Albany but throughout the country, in connection with the stove business, than that of Joel Rathbone. In partnership with Mr. Heermans, who died in 1830, he opened a stove store in Albany, obtaining for some years his castings from New Jersey, and entered upon the business with such energy that in a short time his was the leading establishment in the country. The cost of transporting the castings from New Jersey, especially as a part was returned to Philadelphia and New York as finished stoves, being so heavy an item, he at first had some made from his own patterns in foundries in Albany which were chiefly engaged in making castings for machinery and agricultural tools; and soon afterward erected a foundry solely for stoves. His cupola furnace, which he built in 1838, is believed to have been the very first in the country for making stove castings. By this process castings were made smoother, and by dispensing with superfluous material they were furnished cheaper, and thus became more extensively used. This may really be said to be the commencement of the Stove Business as a leading pursuit, which increased with such rapidity that in a few years the name of Rathbone became a household word throughout the United States, and also in the British Provinces. At the present time the "Rathbone Stove Works" are among the largest in Albany. They are situated in the upper part of the city, near the canal, the buildings being respectively 314 by 151 feet, and 250 by 125 feet, and cover nearly two acres of ground—some of them are four and five stories in height, and the whole floor surface about two and a half acres. There are two moulding rooms, one being 170 by 136 feet, and the other 125 by 80 feet—amounting in all to 33,120 square feet. Each of these has a sheet-iron cupola furnace capable of melting twenty tons per day; and when worked to its full capacity this establishment can turn out thirty tons of clean castings, making three hundred stoves per day. The average number of hands employed in all the departments is three hundred, but for short periods they have employed nearly 500. The average production of Stoves is 35,000, but in some years it has amounted to 40,000. The consumption of iron is from 3500 to 4000 tons, and of coal from 1700 to 2000 tons. Constantly introducing new patterns, requiring new "flasks," six men are employed in making new and repairing old ones. About 8000 of these flasks are in constant use in their establishment, and a two-story shed is filled with others ready for use.

As much as one hundred thousand dollars have been paid in wages in a single year, and the sales have amounted to a half million. A modern traveler asserts that he saw the Rathbone stoves in Constantinople, and on boats far up the Nile.

The present proprietor of these Works is Mr. JOHN F. RATHBONE, a nephew of Joel Rathbone, and a gentleman of capital and experience, fully qualified to maintain the reputation of the establishment.

S. H. Ransom & Co. are another of the leading Stove Founding firms in Albany, and the only one we believe that has survived without change the disasters of the last few years. Their works are situated on the banks of the Hudson River, in the southern portion of the city, and cover four entire squares. They give employment to about three hundred men, and have cast in a single year three thousand tons, or more than thirty thousand stoves, which have been distributed to all parts of the United States, and not a few have been shipped to foreign countries. Their iron warehouse on Broadway is one of the most elegant and capacious edifices that adorn that thoroughfare.

The other Stove Founders in Albany at present are S. B. McCoy, Shear, Packard & Co., and James D. Wasson. The entire product of all the foundries is about 18,000 tons per year.

In addition to the Stove Foundries, Albany has two manufactories of Hollow Ware, one of them ranking among the most extensive in the United States. Mr. John A. Goewey, the proprietor of this foundry, is the successor of Corning & Goewey, who succeeded W. C. Noyes, who commenced the business in 1853. His foundry possesses every convenience for an extensive business, as will be inferred when we state that over 120 men are employed in it, and about ten tons of iron are melted per day. Mr. Goewey supplies not only the stove foundries of Albany and Troy, but founders and dealers in other cities and in various parts of the country obtain their Hollow Ware from his establishment. His castings are said by competent judges to be fully equal to any made in the United States.

Mr. Goewey is also the inventor and patentee of a railroad car and switch Lock, of which he makes about forty dozen per week. These locks are in use on the principal railroads of the United States.

Mr. Hilan Seabury has recently commenced business as a Hollow Ware founder in Albany, and gives promise of attaining a fair share of success.

Albany has also an extensive manufactory of Fire Brick and Stove

Linings, known as the "Salamander and Albany Fire Brick Works," of which Palmer, Newton & Co. are proprietors.

To obtain linings that were good conductors of heat, and yet strong enough to bear transportation without fracture, has long been a desideratum of Stove and Range manufacturers, and judging from the extent of their business, we infer that this firm has attained the desired result. They supply not only the foundries of Albany and Troy, but the extensive Range manufacturers of Boston and Providence, and also many dealers in New York, Baltimore, and other places.

Among the specialties of this firm's manufactures, we might mention Fire Brick Grates for Thompson's patent furnace for burning wet tan. This improvement is of immense value to tanners, enabling them to use as fuel the tan which was heretofore an encumbrance to them, and thus save not only the expense of its removal, but of purchasing other fuel.

Besides the Stove foundries, Albany has several important establishments in other branches of the Iron manufacture, including one celebrated manufactory of Car Wheels, owned by George H. Thatcher & Co. This establishment, though not so large as some others in the country, has an excellent reputation, and when in full operation turns out over 100 wheels per day. Messrs. Thatcher & Co. manufacture the Atwood Patent Corrugated Wheel, the Dorsch Patent Wheel, and other patterns which experience has proved can be successfully cast and chilled, and possess strength and durability. In each wheel the proprietors of these works use from eight to twelve varieties of the best American charcoal iron, and exercise great care and judgment in selecting and mixing them. Every heat is subject to a test in order to determine (and when defective, remedy) the exact temper or degree of hardness. The New York Central Railroad and other important roads are chiefly supplied with wheels from this establishment.

The Albany Breweries and Distilleries.

The manufacture of Malt Liquor has long been a prominent pursuit in Albany. The oldest Brewer, now living, is Mr. Robert Boyd, who commenced the business in 1797. At that period there were two or three small Breweries—one belonging to Mr. Gansevoort, situated on Maiden Lane, below Broadway, where Stanwix Hall now stands. Another was owned by Mr. Van Schaick; and a Mr. Gill commenced about the same time as Mr. Boyd. Subsequent to this, one Lloyd, who was succeeded by LeBritton in 1805; Robert Dunlop in 1806; Boyd & McCulloch in 1808; then succeeded H. Burrill and L. Fiddler, who in connection with Mr. John Taylor founded the firm of Fiddler & Taylor in 1822.

At the present time the largest Brewery in the United States is that of John Taylor's Sons, of Albany. It is located in the square bounded by Broadway, Ferry and Arch Streets and the Hudson River, and covers about two acres of ground—the main building being 200 by 80 feet, and six stories high. Adjoining the main building on the river front is a fire-proof storehouse seventy by forty feet square, and seven stories high. In this building elevators are erected which convey the grain from boats on the river to the bins on the top floor of the brewery at the rate of one thousand bushels per hour. Between Ferry Street and the main building fronting on Broadway, is a two-story edifice 200 by 50 feet, a large portion of which is used for coopering, cleansing, and steaming casks and barrels. The steaming apparatus was imported from Europe, and is probably one of the most effective ever built. After placing a row of barrels in position, the steam is driven completely through the staves, an inch in thickness, in ten minutes after its application. On the main story the front of this building is occupied by the counting-house and private office of the proprietors. In the upper story is a fire-proof apartment, fifty feet square, which contains a most valuable library of over ten thousand volumes—a rare feature in business establishments of this description. On the Broadway front of the Brewery is a tower, the top of which is one hundred and thirty feet above the level of the street, and which contains a clock with glass dials six feet in diameter, that are illuminated nightly.

The apparatus and equipments of this Brewery are of the most perfect description, and it has the capacity to produce over two hundred thousand barrels per annum. Previous to its erection in 1850, the senior of this firm visited Europe and made drawings of the most important improvements which he saw in the London Breweries. The pontoon apparatus for cleansing and refining the ale, consisting of three hundred and sixty-five large cedar vessels, with floats so arranged as to open and shut the valves, the liquor being always at the same height, independent of the flow of yeast in the receiving troughs, is as yet a novelty in American breweries. Connected with this establishment are five large Malt houses, in which they malt all their own barley.

Within the year 1863 the senior partner and founder of this firm died, highly esteemed and regretted—and also another of the partners, Edmund B. Taylor, of the Boston branch—leaving the management to the two remaining sons, Joseph B. Taylor, of New York City, and William H. Taylor, of Albany. They have a capital of nearly a half million of dollars invested in the business.

Previous to the erection of the Taylor Brewery, the largest in Albany was that of U. Burt & Co. The founder of this firm, Mr. Uri Burt, was engaged in the business of brewing since 1819, but the house of which he was the head dates its existence from 1836, when he and his son Charles A. Burt commenced business. The present Brewery, which occupies the block bounded by Centre, Colonie, Montgomery and Lumber Streets, being a square of 325 feet by 209 feet, was erected in 1847, to which an addition was made in 1851, and a malt house built capable of malting 100,000 bushels of barley per annum. They brew annually over 50,000 barrels—in one year 1,860,825 gallons—but their capacity to manufacture is much greater than this.

This firm was the first we believe to test the question whether malt liquors could be sold for cash only. They invariably obtain payment on delivery, not only for the ale but for the cask, when it is sent beyond the city limits—the money being refunded when the cask is returned. No variation is made from this rule except in the case of wholesale dealers, who are drawn upon at the beginning of every month for the amount of their purchases during the preceding month. They claim that by thus escaping losses from bad debts, they can afford to use better stock and increase the quantity of malt; and as their sales are large notwithstanding the adoption of a strictly cash system, the presumption in favor of the claim seems to be well founded.

The founder of this firm has recently deceased, and the business is now conducted by his son, Charles A. Burt, surviving partner, who exercises in its management the same judgment and skill that aided to build up the establishment to its present prosperous condition.

The "Arch Street Brewery," Boyd, Brothers & Co., proprietors, is another large establishment in Albany. Though the present firm commenced as recently as 1850, they may be fairly regarded as the successors of their father, Mr. Robert Boyd, who has been mentioned as the oldest brewer in Albany now living.

In 1796, Mr. Robert Boyd, the father of Robert, then living on an island below Albany, employed two Scotchmen, one of whom was a brewer, the other a maltster, to assist him in harvesting his grain. These men, who had emigrated to Canada to establish a Brewery, induced Mr. Boyd to build one. This was erected at the corner of Arch and Green Streets, and commenced brewing in 1797. It was but 24 by 30 feet, comprising a brewery and malt house. The two Scotchmen conducted the malting and brewing, and were required to instruct Mr. Robert Boyd, while his father furnished the capital. Mr. R. Boyd gave up the business in a few years and removed to the country, but returned in 1808, and was the senior partner of the firm of Boyd &

McCulloch, who for many years conducted a heavy business. After various changes the Brewery was rented until 1850, when the present firm engaged in the business. The buildings, which had been added to from time to time, and now front on four streets, Green, Arch, Franklin and Perry, the length on Arch Street being 321 feet, are large and conveniently arranged, having the malt house in the same building, which obviates the expense of carting, and there is abundance of room for receiving and storing empty casks.

The other principal Brewers in Albany are John McKnight & Son, Armsdell Brothers, Anthony McQuade, James Quin, and Becker & Cameron.

There are also several firms engaged extensively in Malting, the principal being John G. White & Son, John Tweddle, and A. A. Dunlop. John G. White, who is also the President of the Bank of the Capitol, and the oldest in the business, has two malt houses, and supplies largely the brewers in Philadelphia, where so much malt is used, besides those in other cities.

Mr. Tweddle commenced the manufacture of malt in West Chester, Pennsylvania, many years ago, and removed to Albany in 1838. While the brewers in the principal cities from Portsmouth to Baltimore, as well as those in the interior, obtain Malt from his extensive malt house, his sales are chiefly in New York City.

Mr. Dunlop is the son of Robert Dunlop, a well-known brewer fifty years since, and was himself a brewer. His extensive establishment is in the adjoining town of Watervliet, and here he supplies brewers in New York and other principal Atlantic cities. Mr. Dunlop is also extensively engaged in brewing at West Troy.

There are two large DISTILLERIES in Albany, one of which, that of Edson & Co., distils from the grain; the other, that of John Tracey & Co., is devoted to rectifying liquors and making alcohol. Besides these there are a number of smaller rectifying establishments. The value of the yearly product varies with the price, but the average is nearly two million dollars.

The Distillery of Edson & Co., erected in 1849, consumed for a year or two but 450 bushels of grain per day. In 1851 a small column was erected for the manufacture of alcohol, capable of running 600 gallons per day. That small amount was then ample for the supply of the trade, indeed it required an effort to dispose of it. As the demand increased, another column was in 1853 added to the works, capable of running 800 gallons daily. In 1855 and 1856 the Distillery was enlarged so as to consume 900 bushels of grain per day. While superintending the starting of the new works, Mr. Cyrus Edson, the proprietor, was killed by the explosion of the steam-boiler, May 15th, 1836. Since that period the business has been conducted by the present proprietors, Franklin Edson and Daniel Orr, and the works have been further enlarged. They now employ 35 men, and turn out daily 4000 gallons of Highwines and 3200 gallons of Alcohol. Besides using all the product of their own Distillery, they purchase largely, all of which they make into alcohol.

The use of Alcohol has increased greatly during the past few years. Large quantities are now consumed in making Burning Fluid, which requires four gallons of alcohol to one of camphene; while druggists have increased its use in their various preparations.

The other firm mentioned, that of JOHN TRACEY & Co., have a very large Rectifying establishment, and Alcohol and Camphene Distilleries. Their Alcohol and Rectifying establishments are perhaps not surpassed by any in the country. From the former they turn out daily upward of six thousand gallons highest proof alcohol, and from the latter they are able to furnish daily eight thousand gallons spirit and domestic liquors, which they sell principally in Boston and New York.

Mr. Tracey commenced Rectifying in a small way about 1842 and gradually extended his facilities. The manufacture of Alcohol he commenced in 1847, making six hundred gallons daily, which more than supplied the demand at that time. Now ten thousand gallons of alcohol are daily made in Albany, of which Messrs. Tracey & Co. make much the largest proportion.

Albany has also one of the largest and oldest-established manufactories of Carriages in the United States. Mr. James Goold, the senior proprietor, commenced the business of carriage making in 1813, and soon after engaged in building Coaches, which for many years was a prominent business in Albany and Troy. More recently the firm of James Goold & Co. embarked in Car building, and now carry on all branches of the Carriage manufacture, including Railway Carriages. The factory occupies nearly a square bounded by Division, Union, and Hamilton Streets.

MANUFACTURES OF TROY.

Troy, six miles above Albany, is even more largely engaged in manufacturing than that city. In 1860 it had 366 establishments, with a capital of $5,231,650, which employed 5,877 males, 4,669 females, and produced $11,682,989. The principal manufactures were the following:

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Agricultural implements	4	$77,100	79	......	$116,025
Boots and shoes	44	202,750	457	103	487,007
Brass and bell founding	3	39,000	23	......	126,000
Brewing	5	175,000	61	......	163,000
Brushes	18	263,100	594	481	551,900
Cabinet ware	9	86,500	77	4	108,800
Cassimeres	1	50,000	46	39	105,365
Cigars	13	19,700	68	......	87,030
Clothing	29	186,250	279	430	532,850
Coffee and spices	1	23,000	......	......	93,037
Confectionery	4	16,500	21	2	68.480
Cotton goods	2	130,000	101	179	159,294
Flour and meal	6	140,000	24	......	348,408
Gun powder	1	80,000	16	......	84,000
Hardware	2	80,000	100	6	93,500
Hosiery	2	92,000	73	101	161,000
Iron { Albany Iron Company, Burden's Works, and Rensselaer Works }	3	846,000	1220	......	1,950,000
Jewelry	3	16,500	13	......	50,000
Leather	6	290,500	161	......	465,000
Machinery	5	30,500	35	......	50,250
Malleable iron	1	15,000	8	......	30,000
Malting	2	49,000	15	......	126.000
Oil cloth	2	180,000	64	......	130,000
Paper boxes	4	12,200	22	28	36,985
Printing and publishing	7	41,200	228	......	180.880
Rectifying liquors	2	110,000	14	......	253,815
Safes	1	30,000	100	......	210,000
Sawed lumber	7	34,460	82	......	388,230
Sheep skins	3	24,000	47	......	258.020
Shirt collars and bosoms	12	248,900	66	3007	778,750
Shoddy	1	15,000	18	16	62,500
Springs	1	32,000	55	......	88,220
Stoves	8	480,000	711	......	1,022,250
Tinware	20	89,100	108	6	207,272
Turbine wheels	1	23,000	25	......	45,000

REMARKABLE MANUFACTORIES IN TROY.

The Albany Iron Works—Corning, Winslow & Co., Proprietors.

In 1819, John Brinckerhoff, then an enterprising iron merchant of Albany, erected on the Hudson River, now in the sixth ward of the City of Troy, a small Foundry and Rolling Mill, for converting Russia and Swede iron bars into plates. These plates were afterward cut partially into nails, each nail being headed by hand. This business he conducted successfully for several years, and the works, though small and insignificant compared with their present extent, were creditable to their founder, and among the first then in existence in the State of New York. From Brinckerhoff they were transferred to Corning & Norton, and subsequently to the present proprietors, Corning, Winslow & Co., who have enlarged them until they now rank among the most extensive in the United States.

The works at present include three distinct rolling mills—one a large steam mill, containing 18 puddling furnaces, with a corresponding number of heating furnaces, five steam engines, one large Nasmyth hammer, two drawing-out hammers, four complete trains of rollers, Winslow's rotary squeezer with shears, roller lathes, wrought railroad-chair machinery, and other appurtenances; the whole within a brick building 365 feet long by 145 feet wide, covered with an iron-trussed roof. The second is a new forge and rolling mill, built in 1855. It is of brick, in the form of a cross, the greatest width and length being respectively 173 and 163 feet, and the wings 53 feet wide. This mill has an iron-trussed roof covered with slates. There are three chimney stacks, each 65 feet high, and each drawing from six puddling furnaces, making 18 puddling furnaces under this roof. The third rolling mill is worked by two water-wheels of great power, and contains three complete trains of rollers, with appropriate furnaces, and one steel converting furnace within a brick building 265 feet long by 119 feet wide. There are likewise upon the premises, and driven by water-power, a carriage-axle factory, 60 feet by 40; a spike factory, for making railroad, boat, and ship spikes, and boiler rivets; and a nail factory. Both of these latter branches of business are carried on within a brick building 300 feet long by 35 feet wide, and operated by a water-wheel 30 feet in diameter, the water-power being furnished by the "Wynantskill," affording a fall of about sixty-five feet, divided by three dams into as many successive falls. All the buildings of this fine establishment are of brick, with metal roofs, and constructed in the most substantial manner, being as nearly fire-proof as possible, the proprietors having been taught to "dread fire" by two conflagrations which consumed all the earlier erections. The number of acres attached is between forty and fifty, on which there are numerous buildings, constituting a small village in itself.

The principal manager of these extensive works is John F. Winslow, Esq., whose experience in the working of metals is not excelled by any one engaged in the trade. He is also a man of genius, and the inventor of several highly valuable improvements to facilitate the working of iron. His rotary squeezers is a most effective machine, as one will do all the shingling for forty puddling furnaces, with but a trifle of expense for attendance, a small consumption of power, no waste of iron, and turning out the blooms very hot it facilitates the rolling. This preservation of the heat, coupled with the fact that the bloom is very thoroughly upset while undergoing its rapid squeezing, is said to sensibly improve the quality of the iron.

The firm of Corning, Winslow & Co. is now extensively engaged in the manufacture of puddled steel, which they commenced soon after the art of effecting it was made known in Germany about the year 1852. Few men in this country, if any, have devoted more attention to this subject than Mr. Winslow. Their puddled or semi-steel is capable of bearing a tensile strain ranging from 90,000 to 108,000 pounds to the square inch, and is beyond a doubt equal in every respect to any made in Europe. This material is now largely made into locomotive tires, boiler plates, and other forms where great strength and density are required. It is further manufactured by cementation and put into spring-steel for carriages and rail-car purposes. Corning, Winslow & Co. we believe are at present the only makers of semi-steel in the United States.

This firm give employment to about 750 persons, to whom are disbursed about $18,000 per month for wages. The annual product of the concern is about 15,000 tons, consisting of cut nails, spikes, rivets—band, bar, rod, and scroll iron, of all sizes—with large quantities of railroad-car axles, wagon axles, crowbars, and wrought-iron railroad chairs. They have a capital, invested in real estate, buildings and machinery, of about a half million of dollars.

Within the year 1863 a very considerable addition was made to their works, consisting of another mill for bar and band iron, about nine additional puddling furnaces, machinery and buildings for making Horse and Mule Shoes, extensive machine shops, and several dwellings for the families of employees.

The Troy Iron and Nail Factory—H. Burden & Sons, Proprietors,

Is another very large establishment in Troy, and, with the additions that have recently been made, is now one of the largest in the United States. Though there was previously a small factory, having a few Cut Nail machines, near the site of the present mill on Wynant's Kill, the works may be said to owe all their success and importance to the present proprietors, and primarily to Mr. Henry Burden, a native of Scotland, who came to this country in 1819, and who has been connected with the works since 1822.

Few men, now living, have had more experience in the working of metals than the gentleman mentioned, and none probably have more faithfully discharged the duty which Lord Bacon has said every one owes to his profession, by contributing something for its benefit. He is the author of several very ingenious and important inventions designed to facilitate the working of iron, among which we may mention a machine for making Spikes, another for making Horse Shoes, and the Rotary Squeezer for rolling Puddle Balls, now so generally used both in Europe and America. Burden's Spike Machine, patented in 1839, will make Spikes complete, including head and point, at one operation, at the rate of fifty per minute; and thus each machine will do the work of fifty men. Nearly all the tracks of railway in the United States are fastened with Spikes that were made by this machine, and that the progress of railroad-building has been thereby accelerated is evident, for Spikes could not have been made by hand with sufficient rapidity to supply the demand. His other invention mentioned for making Horse and Mule Shoes, is even still more ingenious in its nature than that for making Spikes, and in its automatic action and practical results is entitled to rank in the scale of inventions with Bigelow's Carpet Loom and Blanchard's Lathe for Turning Irregular Forms. A rod of iron fed into this machine is converted into Shoes entirely completed, with creases and countersunk holes (leaving nothing more to be done except to clean out the holes after being cooled), and each machine performs in a minute a day's labor of two men. Five of these machines are now in operation in Burden's Works, with five more in course of construction, and the number of tons of Shoes manufactured in a given time may be calculated by assuming the average weight of a shoe to be one pound, and the product of a machine, if kept supplied with hot iron, to be 3600 pounds per hour. Mr. Burden is now engaged in perfecting a machine for Rolling and Welding Bars, which, if successful, as it promises to be, is destined, by its economy of labor, to effect a revolution in the manufacture of iron.

The Works of this firm comprise two extensive Rolling Mills, distinguished as the Old Mill and the New or Steam Mill, two Forges, a Spike Factory, a Nail Factory, Foundry, Pattern Shops, etc. The old factory, situated on Wynant's Kill Creek, is a stone-and-brick structure 550 feet long, 140 feet wide, and has 24 furnaces in all, seven trains of rolls, and five Horse Shoe machines. All the operations of making bars from the pig, bloom and scrap, are carried on in this mill, but the most novel and interesting feature is the manufacture of Horse and Mule Shoes to which we have alluded, and of which thirty-eight different sizes and patterns are made, ranging in weight from 6 ounces to 2 lbs. 10 ozs. Adjacent to the rolling mill is the Spike factory, where are ten machines constantly employed in making railroad and ship spikes, and boiler rivets. The manufacture of nails, formerly very extensively carried on at these works, has been discontinued. The motive power of this mill is supplied by an immense water-wheel 60 feet in diameter, the largest wheel of the kind in the country—the next largest being that of the New York Belting and Packing Co., at Newtown, Conn., which is fifty feet in diameter.

In 1862, Mr. Burden purchased land having a front on the Hudson River of about a mile and a quarter, extending eastwardly to the Hudson River Railroad, and proceeded to fill up the low land at an expense exceeding one hundred thousand dollars. On this the firm erected a brick forge 400 feet long and 100 feet wide, and a rolling mill 300 feet by 100 feet—works that in convenience of arrangement, abundance of light and air, and freedom from oppressive heat, are not surpassed, if equalled, by any in the United States. There are in these works 36 furnaces (to which the blast is conveyed by pipes under ground), and it is proposed to double the number as rapidly as they can be erected. The motive power is supplied by magnificent engines built by the Corliss Steam Engine Company at Providence. The product of this mill is exclusively merchant bar iron. Improvements are in progress which, when finished, will render the present works, extensive as they are, the mere nucleus of what they will then be.

As many as 1500 men have been employed by this firm at one time in their mills, and the sales in 1863 amounted to nearly $1,800,000. Mr. William F. Burden is now the Superintendent and active manager of the works.

The Rensselaer Iron Works

Are another of the prominent iron manufacturing establishments located in the sixth ward of the city of Troy. They are situated on the banks of the Hudson River, and comprise a main building 430 feet in length by 150 in width, with machine and blacksmiths' shop, etc., adjacent. There are 14 puddling furnaces and 13 heating furnaces, which together consume about 10,000 tons of bituminous and 15,000 tons of anthracite coal per annum. About 6000 tons of pig iron and 14,000 tons of old rails are annually used in these works and converted into railroad bars and merchant iron, which are the principal products. A machine for finishing locomotive tires is run in connection with the rail mill. The machinery is propelled by an upright low-pressure engine of 365 horse power.

The works were originally erected by the Troy Rolling Mill Company in 1846, and were reorganized by the present proprietors, the Rensselaer Iron Company, in 1853. The Hon. John A. Griswold, now a Representative in Congress from the Troy district, is President of the Company, and George Babcock, Esq., Superintendent. About 450 men are employed in the works.

E. A. & G. R. Meneely's Bell Foundry,

Situated in West Troy, is the most extensive and noteworthy manufactory of the kind in the United States. It was founded by Andrew Meneely, the father of the present proprietors, in 1826, since which time thousands of Bells have been sent out from this foundry into every State and Territory of the Union, and to nearly every part of the world. During the last ten years, the number cast annually has averaged 600, of an average weight of 500 pounds—and among them were some weighing 12,000 pounds.

Bells are formed by casting an alloy of copper and tin in moulds prepared for the purpose. The usual proportion is four parts of copper to one of tin. The method of moulding conducted in this foundry is a very great improvement upon the old system. A mould consists of a hollow space the exact form and dimensions of the bell to be cast. Two separate hollow iron cases, shaped like a bell, and of a size to correspond with the casting to be obtained, are employed to form a mould. Their sides are full of small perforations or vent holes. One case is made smaller than the other, and forms the *core* for the inside—the larger one, called the *cope*, forms the outside shell of the mould. The inner case is first swathed with straw rope, and a coat of loam is placed on the outside of this—when perfectly dry it forms the core. The outer case is lined on the inside with loam, and carefully swept, to obtain the proper thickness and surface for the casting. When the cores for a number of bells are ready, they are placed on the even floor of the foundry, and their copes are lowered over them by machinery, and guided to their exact positions by gauges. The spaces between these cases then form the moulds for the bell castings, and different sizes are employed for bells, according to their desired weight. Large reverberatory furnaces are used for fusing the bell metal, and when it has reached a proper state of fluidity it is poured into the prepared moulds in the usual way. The casting operation is an interesting sight at night, as the intense heat of the metal causes numberless jets of bluish-green flame to issue from the vent holes of the mould-covers, which appear like domes of fire, and rival a gorgeous display of colored fire-works. The straw ropes on the cores take fire, and burn very slowly, as the casting cools, and the shrinkage of the metal thus goes on gradually, and prevents sudden and undue straining. Great care and practical experience are necessary to conduct these operations, although apparently simple. The metal must be perfectly fluid, and of the same temperature at every part of the mould, to produce a homogeneous casting. Formerly, when entire loam moulds were employed for bells, these were packed in pits beneath the surface of the foundry floor, to enable them to resist the great pressure of the fluid metal. Serious explosions frequently occurred then, by the confined air within these packed moulds becoming highly heated; and inferior, porous castings, were also very common. These evils are now avoided with the iron vent casings.

After the bells are cast, they are scoured bright in rotary frames, in which a sand cushion is brought to bear upon the surface of the metal. Each bell is tested as to its tone and quality, and if the least imperfection is detected it is condemned. No inferior article is allowed to pass outside the foundry gate. After this, the bells are fitted with clappers and yokes, and mounted on frames. In this foundry all bells weighing 400 pounds and upwards, are fitted with Meneely's Patent Adjustable Yoke (patented 1858 and 1860), which obviates the danger of cracking the bell in consequence of the clapper striking continually in one place. By this contrivance bells can be easily adjusted so as to present a new surface to the action of the clapper.

This firm have been particularly successful in the manufacture of chimes and peals of bells, of which a large number have been made at their foundry and placed in some of the finest church edifices in the country. At least eight bells, representing the octave of the natural scale, are requisite to constitute a full chime, and, ordinarily, a ninth bell is added, tuned a flat seventh above the tenor (largest) bell, by which addition a secondary chime in the key of the fourth is produced, and the range of tunes that may be played is largely increased. Not unfrequently a still larger number of bells are employed, the additional number being toned above the octave of the tenor, in order to obtain greater range in the higher notes. Peals of bells (as distinguished from chimes) consist of from three to four bells attuned with each other at harmonic intervals, which will not admit of a tune being played upon them, but, when rung, either successively or simultaneously, produce a fine effect. It is however usually anticipated, when peals of bells are procured, that they shall form part of a future chime: the intermediate bells to be added as may be desired. In constructing a chime, the tenor bell is taken as the model and unit of measurement of the whole, certain relative dimensions giving the different tones with theoretic exactness. This result does not, however, always follow in practical casting, since it is almost impossible to control the contingencies of the operation so that the conditions of each casting shall be absolutely uniform—any variation in which tends to affect the tone. When the tone of a chime bell thus proves to be incorrect, it is laid aside to be sold as a single bell, and the operation of casting is repeated, care being taken to vary the conditions as may be required; so that when the chime is completed each bell is in its perfect condition as it comes from the model, the quality and force of its tone not being impaired as in the English mode of tuning by having a belt of metal clipped from the side. The usual mode of placing a chime in the bell tower is, to mount the tenor bell in the centre of the bell-section, it being provided with yoke, wheel and frame, so as to be rung as an ordinary church bell, as also to be used in the chime. The remainder of the bells are suspended stationarily about the tenor from frames or beams of oak, in such relative positions as shall best conform to the capacity and construction of the bell-section and most equally distribute the weight. When chimed, the bells are all played upon by one person, by means of cords attached to the clappers and led down to the ringer's room below, there connecting with levers arranged in the order of a key-board, and worked by the hands or the feet as may be desired.

Messrs. Meneely have published a pamphlet for gratuitous circulation which gives a good deal of general and specific information on the subject of Bells.

Besides the establishments mentioned, Troy contains other important manufactories. There is the Safe Manufactory of Lewis Lillie, whose sales amount to nearly $400,000 per year; there are the Stove foundries of Fuller, Warren & Co., Charles Eddy & Co., Ingraham, Phillips & Co., Riley, McConihe & Hay, Wilcox, Morand, Keyes & Co., Caleb Williamson, Marcus L. Filley, and others; the Building Foundry of Starbuck Brothers; the Iron Railing Foundry of William E. Clark; the Troy Turbine Wheel and Machine Works (James P. Collins, Agent); the West Troy Foundry and Machine Shop of Augustus Viele & Son; the Car Works of Wm. Gilbert & Co., late Eaton, Gilbert & Co.; the Car Wheel Works of Ingalls & Mallary; the Gun Carriage Manufactory of Parmenter & Bramwell; the Bell Foundry of Jones & Co.; the Ale Brewery of A. A. Dunlop; the Mt. Ida Cotton Mills of Geo. Andrews & Son; the Woolen Mills of J. Roy & Co. and Troy Woolen Company (Wm. J. Ranken, Agent); the Hosiery manufactory of the Troy Hosiery Company (William A. Shepard, Agent); the Shirt Collar and Bosom manufactories of Corliss, House & Co., Bennet & Edson, and many others, that have in operation, in all, 1000 sewing-machines, and employ over 3,000 females. Troy has also, in the establishment of W. & L. E. Gurley, the largest manufactory of Engineering and Surveying Instruments in the United States—the next largest being probably that of W. J. Young, of Philadelphia. For the last fifteen years Messrs. Gurley have used steam power in the manufacture and employed a force of about forty men.

At COHOES, which is four miles from Troy, there are the largest Cotton Mills in the State of New York. These are the Harmony Mills, owned by Alfred Wild, Esq., of Albany, and Messrs. Garner & Co., of New York City. They have 75,000 spindles, and make about fifteen million yards printing cloths annually. The distinguishing feature of the manufactures of the town, however, is the large number of Hosiery and Knitting factories. It was here that Egbert Egberts, in 1832, succeeded in applying motive power for the production of knit goods. The principal mills now engaged in this manufacture are the "Watervliet Hosiery Mills," owned by Charles H. Adams and S. D. Fairbank, the Bailey Manufacturing Company's mill, built in 1845 by Egberts & Bailey, the Mohawk River Mills, the Clifton Company, incorporated in 1862, the Tivoli Mills of J. G. Root & Sons, the Tivoli Hosiery Mills of L. S. & J. H. Parsons, the mills of Alden, Frink & Bingham, the Halcyon Mills, and the American Hosiery Mills, besides several other factories, that employ an aggregate of thirty sets of machinery. There are also in the town a factory having 27 machines making solid-headed Pins, two Axe factories, a foundry and machine shop, a Bobbin factory, a Needle factory, Sash and Blind factories, Bedstead factories, an Omnibus Wheel factory, Saw and other mills.

MANUFACTURES OF ROCHESTER.

ROCHESTER, by reason of the splendid water-power afforded by the Falls of the Genesee River, and its situation in the centre of a rich agricultural district, has peculiar natural advantages for manufacturing operations. Its infant enterprises, and their early history, were alluded to in the first volume of this work. In 1860 the city contained 545 manufacturing establishments, having a capital invested of $4,145,030, employing 5,136 males, 1,431 females, and produced an annual value of ten millions of dollars. The principal manufactures were:

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Agricultural implements	5	$258,500	88	......	$173,750
Alcohol	1	120,000	9	......	153,000
Brewing (1)	14	171,600	57	......	237,590
Cabinet ware	8	79,350	256	......	137,135
Carriages	6	65,800	23	......	72,650
Cars	1	25,000	58	......	60,700
Chairs	3	40,300	102	......	177,600
Cigars and tobacco	4	20,500	51	......	85,860
Clothing	38	336,600	800	735	1,156,466
Coffee and spices	1	15,000	8	......	38,700
Confectionery	3	14,000	23	......	55,500
Cotton goods	1	115,000	40	135	85,000
Distilling	3	25,000	7	......	73,950
Flour (2)	19	900,000	......	......	2,563,425
Hardware and tools	10	119,900	209	......	150,500
Harness	11	8,600	34	......	46,630
Iron founding	2	40,000	65	......	70,000
Iron railing	2	9,000	11	......	19,000

(1) In this item the census-takers erred greatly, or the product of 1860 was much below the average. The more reliable statistics of this branch are as follows:

14 Lager beer breweries, product 60,000 barrels, worth *a* $5	$300,000
4 Ale and porter breweries, product 55,000 barrels, *a* $7	385,000
Malt	80,000
Total product	$765,000

Longmuir's Brewery, in Rochester, is probably the largest west of Troy. It was a few years since destroyed by fire, but has been rebuilt, with all the latest improvements. The building is 125 feet long and 100 feet deep, and the total area of the floors is 62,500 square feet. A powerful hydraulic apparatus, driven by water-power, throws water to all parts of the building, thus ensuring great cleanliness, as well as a precaution against fire.

(2) In the statistics of this branch the census-takers have erred more seriously even than in Brewing. There are 24 mills, having 122 run of stone, that average daily 6100 barrels of Flour for 150 days, or 915,000 barrels a year—which, supposing Flour to be worth $6 per barrel, would make the product $5,490,000. Add to this the coarser grains, feed, etc., and it will be seen that the milling interest of Rochester ranges from six to eight millions of dollars a year.

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Jewelry	5	8,350	9		16,800
Leather	5	43,000	69		113,810
Locomotive lamps	2	25,000	33		76,065
Lumber	3	26,000	28		84,340
Machinery and steam engines (1)	8	111,500	132		213,650
Mattresses	2	13,000	5	6	52,400
Millinery	3	7,500	15		28,700
Paper	1	60,000	54	30	112,500
Patent medicines	2	20,000	8	8	65,000
Perfumery	1	15,000	1	20	75,000
Picture frames	4	5,100	13		29,250
Planed lumber	2	21,000	26		78,000
Pottery ware	3	15,300	16		13,000
Printing and publishing	4	159,000	222		239,420
Sashes, doors and blinds	8	12,250	31		53,960
Saws	1	22,000	16		16,000
Scales	1	10,000	25		64,963
Shirts and collars	2	7,000	1	16	22,720
Soap and candles	2	18,000	10		33,920
Spokes, felloes, and hubs	2	22,000	23		40,728
Staves	4	38,000	84		82,450
Thermometers	2	3,500	5	6	14,475
Tin and sheet-iron ware	14	67,000	79		121,720
Trunks	3	12,500	28	2	30,715
Whips and gloves	4	10,900	33	30	38,250
Wood working, flour barrels, etc	39	80,050	363	103	272,585

Rochester is remarkable for the extent and character of its Fruit Nurseries. It is estimated that there are within ten miles of the city not less than 4,000 acres devoted to this culture. A single firm have a nursery that occupies 500 acres, and is probably the largest in the world. There are others of 350 and 250 acres each. The sale of Fruit Trees is estimated to amount to a million of dollars annually.

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(1) We have no means of verifying this return of the census-takers, but we apprehend that the product has been considerably under-rated. There are several large firms engaged in the business in Rochester.

WILLIAM KIDD & Co., for instance, manufacture Car Wheels, Steam Engines, and especially Mill Gearing, very extensively.

D. A. WOODBURY & Co. have one of the most remarkable Steam Engine establishments in the United States. In 1851 this firm astonished the makers of steam engines by publishing and offering a list of certain sizes, ranging from ten to thirty-five horse power, at prices much below any that had ever been heard of before. This they were enabled to do by building a large quantity of each size at one time and confining their attention to one article of manufacture. Their workshops are conducted upon the English plan, each workman having a limited and uniform range of duty throughout the year. The principle upon which they commenced business secured the favor of the public, and their Engines are so popular both in the United States and in the Canadas, that though they designed to keep a large stock of finished Engines on hand at all times, the demand has outstripped their facilities for manufacturing. Messrs. Woodbury & Co. are about erecting new and more commodious workshops.

Along the line of the New York Central Railroad, between Troy and Rochester, there are several important manufactories. At Ilion, in Herkimer County, which is eighty-three miles west of Albany, is one of the largest private Gun manufactories in the United States, known as

E. Remington & Sons' Armory,

remarkable alike for its extent, and for its origin. The story of its origin has been told as follows: On Steel's Creek, about three miles from the site of the Armory, dwelt the father of the present proprietors, who, desiring a rifle-barrel for his own use, forged one, in 1816, with no other tools except such as an ordinary blacksmith's shop contains, and conveyed it to a gunmaker at Utica to have it fitted and completed. The gunmaker was much pleased with the skilful construction of the barrel, and Mr. Remington, perceiving the high estimation in which his workmanship was held, dexterously applied his knowledge to a profitable use, and commenced the manufacture of gun-barrels; and not long after this incident, the banks of Steel's Creek blazed with the cheery fires of many forges, and the surrounding hills rang with the joyous music of the anvil. The old factory, however, was found to be too distant from the line of transit—then the Erie Canal—and in 1829 Mr. Remington purchased a farm at Ilion, upon a portion of which, on plans supplied by himself, the establishment is erected. For many years the business was limited to the fabrication of barrels, but having received a large contract from the United States Government for arms, the manufacture of Rifles and Carbines, including all their parts, was embarked in, and has since been very successfully prosecuted.

Many of the most important improvements which now render the American firearm the most durable and effective in the world, have had their origin with this firm. They are accredited with having been the first to adopt steel as a material for the barrel of sporting guns, and we believe they now employ it exclusively in the manufacture of arms which they are making for the government service. For thirty years they have been patiently testing the steel of almost every manufacturer both in this country and abroad, and, by a long course of experiments, have ascertained which is the best adapted for the purpose. By the application of machinery to the manufacture of gun-locks, this firm has been largely instrumental in effecting a revolution in the trade in these locks. In England, whence nearly all the locks in use were formerly imported, they are made by hand; but in the Remington Armory every piece is made by machinery to a fixed and unvarying gauge, and the result is that not only are American Gun Locks cheaper than the foreign, but as each piece is uniform with every other of the same description, a great saving of labor is effected in putting them together. Not long since, at the Arsenal at Bridesburg, Penn., 20,000 of Maynard's Priming Locks, of Remington's make, were fitted to old musket barrels, which had been rifled, and as Major Hagner, the Superintendent, has certified, with an economy of labor that was a marked advantage.

The result which usually attends an unwavering determination to produce nothing but good mechanism, combined with a genius for improvement and invention, is illustrated in the growth, progress, and present extent of this establishment. The Armory occupies two acres of ground, and the buildings, some of them four stories in height, have a frontage of 400 feet. Within the last two years large additions have been made not only to the structure, but especially to its resources in machinery Both steam and water power are employed in driving the machinery. Several steam engines are used upon the premises, the largest of which is of one hundred and fifty horse power, a second of fifty horse power, and a third of twenty-five horse power, with other smaller engines. Overshot, breast, and several Turbine wheels are also employed. Each process has its appropriate apartment—the aggregate comprising the welding and forging room, the lock and limb finishing room, the barrel room, the stocking room, the machine shop, the polishing room, and inspecting room; and each presents a scene of constant and interesting activity. From 600 to 700 men are employed in these works. This firm have also a branch of their Armory at Utica, N. Y., employing about 200 men in the manufacture of their Army Revolver.

The capacity of Messrs. Remington's establishment for the manufacture of firearms amounts at present to 150 Rifles and 500 Revolvers per day of the various kinds, which in the course of a year would be nearly 50,000 stand of arms, and upward of 150,000 revolvers. It is therefore, at the present time, one of the nation's resources on which the Government can rely with confidence for weapons with which to defend its existence and annihilate its foes.

At Utica, which is 95 miles from Albany, is a large and probably the oldest manufactory of French Burr Stones in the United States, known as Hart & Munson's Mill Stone Manufactory. It was established by Mr. A. Munson, an uncle of one of the present proprietors, in 1825. Its claims to distinction, however, do not rest upon the fact of its antiquity, but upon the many new and valuable improvements which the firm have made in the manufacture of machinery appertaining to the furnishing and complete equipment of a modern mill. Mr. E. Munson, of this firm, is a practical millwright, and has made the interest with which he is connected his debtor by the many valuable improvements which he has designed and contributed for its benefit.

One of his inventions, which was patented in 1849, is a machine for balancing and finishing Burr Mill Stones. By means of this machine, the mill stone, after it is blocked up, is suspended upon its centre, where it is balanced in the course of filling up and finishing, instead of being filled up, as is usually the case, without the means of testing the accuracy of its balance. The superiority of mill stones finished in this way, over others, must be evident at a glance. To regulate the balance or correct any inaccuracy which might arise from drying of the moisture, or any other cause, this firm provide a Shot Balance without extra charge, and give directions for using it.

Another valuable invention of Mr. Munson is a new Cast Iron Eye and Mill Spindle, which can be put in an old stone equally as well as in a new one. The eye is formed of an outside and an inside cone, the two cones being connected by spiral wings. The inside cone or hub forms the bail or driving parts, and the driver is cast solid on the spindle. The advantage of this Eye is that it cannot be choked or clogged under any speed, carries more air under the stone, drives nearer the centre, and the runner cannot be thrown off the cockhead. It is peculiarly adapted for small mills where great speed is required.

In 1860, Mr. Munson patented an improvement adapted to mills grinding all kinds of grain, starch, plaster, etc., by which a more perfect adjustment of the stones to each other is secured, and a greater convenience in lubricating the joints, as well as effectually preventing the escape of the oil from its bush. The arrangement by which these important ends are secured is fully set forth in the firm's Circular.

Another valuable machine manufactured at this establishment is *Mattison's Flour Packer*, which, it is said, will save about 33 per cent. of labor in packing in barrels, and about 66 per cent in packing in bags, when compared with the lever press and the usual process of shoveling into bags. Its novelty consists in carrying the bag or barrel full-length upon the cylinder and delivering the flour in a compact state, the barrel or bag receding from the packer in process of filling. They are now in use in many of the best mills in the country.

The works of Messrs. Hart & Munson include a Mill Stone Manufactory, a Machine Shop, Plaster Mills, and Foundry, and are commodious and well-arranged.

Besides the establishment we have mentioned, Utica contains several other important manufactories. For instance, the Washingtonville Iron Works, conducted by Philo S. Curtis; the Iron Railing Manufactories of L. Dean & Co. and Chauncey Palmer; and the Portable

Steam Engine and Boiler Works of Wood & Hurlburt. This firm have effected a revolution in the construction of farm engines, by showing that they can be made light, compact, safe, cheap, and yet efficient. Their engines range from 1½ to 20-horse power, occupy a space from two by five feet to 6 by 7 feet, and cost from $175 to $1700. Recently they have devoted a good share of their attention to the construction of the Excelsior Engines, designed expressly for the oil wells. In Utica also are the extensive Stove works of Wheeler & Bailey, and J. S. & M. Peckham established in 1835. This firm are also largely engaged in the manufacture of Plows, Cultivators, and other agricultural implements, and have the exclusive right to "Peckham's Improved Agricultural Furnace," which is adapted for wood or coal. There are also the Utica Screw Company (C. Miller, Agent); the Utica Steam Cotton Mills (E. Chamberlain, Treasurer); the Globe Woolen Company (Robert Middleton, Agent); and the Oneida Brewery, established in 1813.

At Seneca Falls, which is 189¼ miles from Albany, there are several important manufactories, especially of Pumps, Hardware, and Fire Engines.

One of the first to perceive and take advantage of the water-power furnished here by the fall of the Seneca River, and to whom the town is largely indebted for its present prosperity, is Mr. Abel Downs, who is still at the head of some of its most important enterprises. He is accredited with having introduced the first steam-engine that was used for manufacturing purposes in the town, and with having made the first of the many thousands of Iron Pumps that have since been constructed there.[1] For several years the manufacture of pumps was a specialty

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(1) A local chronicler says:

"In the year 1840, Abel Downs commenced the manufacture of Pumps in the wing of the "Old Cotton Factory," subsequently used as a plaster mill, and finally burned down in the great conflagration of 1853. He erected a small furnace over the river, employing five men. Only wood Pumps were manufactured. Mr. Downs continued in the business about two years, and at the close of the second year returned to the mercantile business, being succeeded in the Pump Factory by Wheeler & Kelley. In the year 1844, Mr. Downs again engaged in the Pump business in company with J. W. Wheeler and Smith Briggs, under the firm of Wheeler, Briggs & Co., for about one year, when Wheeler & Downs purchased the "old stone shop," originally erected by Bement & Co. for a carriage manufactory. Into this building their machinery and materials were removed, and a steam-engine placed in it—the first used for manufacturing purposes in this town—and there was made the first Iron Pump built in Seneca Falls.

In the year 1846, Mr. Washburn Race, who had recently invented and patented his since famous Stove Regulator, came into the firm, and subsequently Silsby & Thompson, who were then in the hardware trade, obtained an interest in the Regulator also. Previous to the purchase by Silsby & Thompson, the firm in the manufacture of Pumps was styled Wheeler & Downs—and in the Regulator it was Wheeler, Downs & Race. After of the firm with which he was connected, but gradually other articles, usually classed as hardware, as Pipe Boxes, Thimble Skeins, Sadirons, etc., were added to the list, and the works were enlarged to meet the demands of an increased business. The Downs Manufacturing Company now consume ten to fourteen tons of iron per day, and employ 200 hands.

A few years ago Mr. Downs engaged in the manufacture of Hosiery, having improved patented knitting machines for the purpose, and has supplied the United States Government with many thousands of dozens of half-hose. This enterprise has culminated in the establishment of the Seneca Knitting Mill Company, of which Seabury S. Gould is President, and Abel Downs, Treasurer, and now extensively engaged in the manufacture of Hosiery, Wrappers, and Knit Jackets.

Besides the Downs Manufacturing Company, and the Seneca Knitting Mill Company, there are the following important manufactories at Seneca Falls:

Cowing & Company's Pump and Fire Engine Works, established in 1840. This firm, composed of John P., Philo, George, and Marshall Cowing, manufacture 250 varieties of Polished Cylinder Lift and Force Pumps, besides Hydraulic Rams, Garden and Green House Engines,

the purchase, the firm in the manufacture of Regulators was changed to that of W. Race & Co.; but Wheeler & Downs retained the sole interest in the Pump business. Subsequently Silsby & Mynderse took an interest in the manufacture of Pumps, and the title of the firm was Downs, Mynderse & Co., Mr. Wheeler having retired from the business. At this time Pumps were manufactured of both wood and iron. This continued up to 1851, when Seabury S. Gould purchased the interest of E. Mynderse, and then the firm was entitled Downs, Silsby & Gould. In the fall of that year Mr. Silsby sold his interest to his partners, when the present firm of Downs & Co. was formed—being Messrs. Abel Downs and Seabury S. Gould. Commencing with five men, and melting from one and a half to two tons of iron per week, the business had gradually increased till in 1851 the amount of capital employed was $40,000, working up about four tons daily, and giving employment to between sixty and seventy men.

In the winter of 1853–4, Downs & Co. built their new works upon the canal and river where they now are, and their business has gradually increased until the number of men employed now amounts to two hundred and upwards, their "heats" consuming from ten to fourteen tons of iron per day. During the year that Mr. Mynderse came into the firm they had of actual cash capital only $6,000, which has been increased to about $150,000—and this combined with real estate and machinery would swell the amount to over $200,000. Their sales in the year 1849 amounted to about $43,000; in 1850 to $70,000; in 1851 to $100,000; and have since increased until they now amount annually to near $400,000.

Messrs. Downs & Co. make 20 different kinds of Pumps, and upwards of 130 different sizes. They have gradually become engaged in the manufacture of many other articles of hardware aside from Pumps, among which are Thimble Skeins, Pipe Boxes, cast-iron Hand Sleds, Smoothing Irons, Jack Screws, Bench Screws, cast-iron Boot Jacks, iron and wood cylinder Meat Cutters, and a great variety of other useful articles. They sell nothing but their own manufactures."

Sadirons, etc. The Island Works, H. C. Silsby, Agent, make Steam Fire Engines and Rotary Pumps. Mowing Machines, said to be very superior, are made by E. F. Herrington; and Garden Implements, Potato Hooks, and Corn Knives, by S. H. Brainard. Sash, Doors and Blinds, are made with improved machinery by Powell & Milk, and Venetian Blinds by H. P. Westcott, who is the inventor of the only successful machine that makes the slats for these blinds.

At LOCKPORT, a thriving town of 12,000 inhabitants, distant 21 miles from Buffalo, there is a number of respectable, though no very remarkable manufactories. The town possesses peculiar advantages for many branches of manufactures, by reason of the vast water-power created by the flow of water from Lake Erie as it passes around the locks and descends from the Erie to the Genesee level. This power is now owned by the *Lockport Hydraulic Company*, who dispose of it on liberal terms and furnish buildings and shafting at a cheap rent to mechanics of moderate capital. The most important manufactories already established there are the Lockport Edge Tool Company, the foundries and machine shops of the Holly Manufacturing Company, Race, Matthews & Co., Alexander Pound, C. G. Hildreth, T. R. Baily & Son, the foundries of Lemuel Gardner and R. Van Brocklyn, the Barrel and Stave factories of B. & J. Carpenter, Hiram Benedict, William Norman, and Daniel Ritson, the Shingle factories of G. D. Root & Son, and C. & H. T. Vandusen, the Saw Mills of D. A. Vanvalkenburg, H. F. Cady, and J. R. Edwards & Co., the Cabinet Ware manufactories of M. W. Evans and Tucker & Beck, the Woolen Factory of L. N. Edwards, the Woolen and Knitting Factory of J. L. Davison, the Flax Cotton Factories of W. J. Daniels, President, and F. N. Nelson, the Paper Mills of G. T. Crouch, the Plaster Mills of John W. Irving and F. J. Lavalley, the Flour Mills of Harman, Cope & Co., Douglas & Jackson, A. H. Smith, H. Finch, J. Playter, William R. Moore & Co., and George H. Elliott, the Distillery of Fletcher & Hoag, the Breweries of J. G. Norman and J. C. Bowers, the Potash Manufactory of L. B. Stainthorpe, the Shingle Machine Manufactory of W. W. Trevor & Co., the Soap and Candle Factory of George Staint rpe, and the Lockport Gargling Oil Company (George W. Merchant, Chemist).

MANUFACTURES OF BUFFALO.

BUFFALO, situated at the eastern extremity of Lake Erie, and the terminus of the Erie Canal, has long been a principal commercial emporium of the West. Her citizens performed prodigies of labor at an early period, when the town contained not more than 2,000 inhabitants, to render the harbor available to the largest vessels and secure the termination of the Erie Canal; and at a later period they erected, at a heavy cost, immense elevators, to facilitate the rapid discharge of cargoes, especially of grain. There are now in the city of Buffalo twenty-one of these automatic laborers, that have in the aggregate the power of transferring 82,000 bushels of grain per hour, and a warehouse capacity of 4,415,000 bushels. By the promptitude with which they clear vessels, fleets have been enabled to leave the harbor in search of other freight within thirty-six hours after their arrival—a dispatch gratifying to the mariner, profitable to the owner, and highly reputable to the port.

During the last fifteen or twenty years the citizens of Buffalo have been not less indefatigable in establishing and encouraging the growth of manufactures, and with a success not less marked than that which attended their efforts to attract to their port the immense agricultural productions of the West. According to the Census Returns, furnished us in advance of their official publication, Erie County, of which Buffalo is the capital, had, in 1860, 791 manufacturing establishments, with a capital of $5,524,871, that yielded a value of $10,777,750. According to the same authority the city contained 404 manufactories, that had a capital invested of $4,617,743, employed 5,217 male and 380 female hands, and produced a value of $8,500,000. This, however, it may be safely asserted, is considerably below the present product. The census officials in Buffalo were not more successful than those in other places in securing accurate returns, as can easily be proved—besides, business was depressed below the average in 1860, and since then there have been important additions to the number of its manufactories. It is probable, therefore, that the estimate of competent judges, who state that the annual value of articles now manufactured in Buffalo is at least twelve millions of dollars, is not an unreasonable one.

The principal manufactures of Erie County, according to the census returns, were the following:

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of Product.
Agricultural implements	6	$290,400	$124,290	277		$377,800
Brass founding	2	11,000	4,030	17		15,500
Brooms	1	4,000	8,000	5		18,000
Blank books and book binding	3	19,500	25,400	23	28	51,000
Boots and shoes	89	89,560	92,264	365	31	226,019
Clothing	35	130,350	201,231	313	173	366,952
Cigars	11	41,050	38,695	71	2	85,790
Carriages	43	126,166	46,882	209		199,330
Cabinet furniture	22	102,700	44,827	150		182,717
Car wheels	1	2,600	28,400	20		51,550
Distilled liquors	3	200,000	580,816	60		795,456
Edge tools	1	25,000	11,500	43		41,000
Flour and meal	36	435,025	1,572,291	133		1,787,920
Glass ware	1	10,000	9,250	60		40,500
Hats and caps	11	50,700	44,887	25	12	72,336
Iron (rolled)	1	63,000	156,000	230		250,000
Iron railing	4	48,800	17,290	28		43,000
Iron forging	1	50,000	29,120	12		35,000
Iron founding	9	138,300	119,236	272		265,905
Leather	40	673,360	868,918	422		1,622,166
Lumber (planed)	5	110,900	85,525	113		186,108
Lumber (sawed)	30	138,525	71,191	161		195,225
Malt liquors	33	168,600	181,324	137		399,226
Malt	5	82,500	116,100	39		129,700
Mill stones and mill furnishing	3	155,000	90,400	89		217,000
Marble work	2	8,400	4,500	18		9,500
Machinery, steam engines, etc.	9	250,600	86,334	372		374,520
Pianos, melodeons, etc.	3	201,000	66,848	150		234,800
Scales, platform and counter	1	5,000	8,000	20		25,000
Stove founding	4	98,000	98,262	252		204,200
Soap and candles	40	39,400	56,492	40		132,412
Sash, doors and blinds	6	69,600	47,720	83		93,350
Saddles and harness	25	28,860	25,190	49		52,687
Saddlery hardware	1	30,000	21,800	40	20	35,000
Shoemakers' tools	1	10,000	10,000	100		70,000
Tin, copper, and sheet-iron work	26	94,500	76,395	98		141,685
Type	1	20,000	40,000	25	5	75,000
Woolen goods	7	51,600	36,750	57	19	70,915
White lead	1	134,000	24,767	20		68,000
Wine (native)	1	40,000	96,000	13		125,000
Wash boards	1	15,000	10,000	20		20,000

REMARKS

ON THE MANUFACTURING ESTABLISHMENTS OF BUFFALO.

Agricultural Implements.—Buffalo contains some of the largest and most deservedly celebrated manufactories of agricultural machines in the United States. To no other city in the Union are the farmers of the West so largely indebted as to Buffalo.

Among the most prominent of these establishments in that city are the PITTS AGRICULTURAL WORKS, owned, we believe, by an incorporated company, from the fact that JAMES BRAYLEY, Esq., is announced as

Treasurer. This concern is indebted for its celebrity mainly to the valuable inventions made by John A. Pitts, from whom it derives its name. This gentleman is accredited with having invented the Treading or Endless-Chain Horse Power, which was patented by him in 1836; also the first Chain Pump, and the first Combined Thresher and Separator, patented in 1837, and which continues to be the leading article manufactured at the Pitts Works. Important improvements have been made in the construction of this machine since it was first invented, and now, when propelled by six or eight horses, it will thresh and clean from 300 to 500 bushels of wheat, and from 600 to 1000 bushels of oats per day, and leave the grain deposited in a perfectly neat and clean condition, requiring no handling after it is once fed into the machine until it is ready for the granary. Over five hundred of these machines are now made and sold annually. Recently the manufacturer has invented an attachment for measuring and registering the number of bushels threshed and bagging the grain, which runs from the Fanning Mill into the Elevator, then into the Reservoir and Measure, and then into the Bag, each half bushel being accurately registered and counted. The value of a labor-saving machine like this, to the country, especially at this time, and to the farmers of the West, cannot be computed.

Besides the Thresher and Separator, several other useful and popular machines are made at these works. We may mention the *Double Pinion Horse Powers*, which are remarkable for their strength, durability, and ease in working; *Pitts' Corn and Cob Mill*, and Rice Hulling machines. Pitts' Works cover an area of about three acres of ground, including the space devoted to the storage of materials. At times as many as two million feet of lumber, almost exclusively of hard wood, are kept in stock.

The BUFFALO AGRICULTURAL MACHINE WORKS are another extensive concern in this branch of manufactures. The proprietors of these works have the control of several patented machines—among others, of *Kirby's American Harvester*, a Buffalo invention. The distinctive feature of this Combined Mower and Reaper is that it will work as well on rough as on smooth ground. This is accomplished by an arrangement by which the finger-bar is independent in its action, or, in other words, rises and falls in following the inequalities of the ground independently of the driving wheel. It is also recommended for its exceeding lightness of draft, and being made of iron it is not affected by exposure to dew, or showers, or sun. This Company have also introduced to the notice of the agricultural community a *Combined Mower and Reaper* which is easily drawn by one horse, and is said to be capable of doing as much work as most machines that require two horses.

The Works are the property of a stock company with a large capital, all paid in, of which **George L. Squier** is President, **Lucien Hawley** Secretary, and **John Valentine**, Superintendent.

R. L. **Howard's Agricultural Works**, where Ketchum's well-known Mower and Reaper is made, is another celebrated establishment in Buffalo. Over 20,000 of these popular implements have been manufactured and distributed to all parts of the country.

About six years ago Messrs. **Miller, Bennett** & Co. took possession of the old "Vulcan Iron Works" and converted them into an agricultural implement manufactory, more especially for the manufacture of *Parkhurst's Patent Adjustable Mowing and Reaping Machine*, better known as the Buffalo Mower and Reaper.

Brass Founding.—The census officials evidently erred in their return of this branch. Instead of there being but two firms engaged in Brass work in Buffalo, we know of three, and there are probably others—the "Eagle" works, F. **Colligon** & Co. proprietors, who manufacture also Portable Steam Engines and Palmer's Hydraulic Lift and Force Pump; the "Buffalo Brass Foundry," **Brown & Ruhlandt** proprietors, who make steam-engine and locomotive Brasswork; and the "Lafayette Brass and Bell Foundry," of which **Adam Good** has been proprietor for nearly a quarter of a century.

Distilled Liquors.—The largest Distillery in New York State west of Albany, is that of **Thomas Clark**, in Buffalo. His consumption of grain is about 640 bushels a day—which, allowing one bushel to each three gallons of spirits, would make a daily product of 1920 gallons, or over 60 barrels. The still in his establishment, made in New York City by weight, is one of the finest ever constructed. It has the capacity of holding 70 barrels. "Clark's Rye and Monongahela" Whiskies are favorite brands in Western New York and in the Western States. In connection with the Distillery Mr. Clark has an extensive Rectifying establishment, and is the largest manufacturer of Alcohol on the Lakes. The oldest and largest Brewery in Buffalo is that of Moffat, established in 1835.

Iron Rolling and Machinery.—The first Rolling Mill erected in Buffalo was that known as the Buffalo Iron and Nail Works, built in 1846 by Corns & Co., and now owned by **Pratt** & Co. The main mill is 176 feet long by 140 feet wide, with Nail factory attached, and has eight puddling furnaces, six heating furnaces, and about fifty Nail machines. Besides this main building, there are blacksmith's, millwright and other shops. The works will compare favorably with the best of similar concerns in the country, and are now turning out large quantities of iron and nails of the best quality.

Recently Messrs. Pratt & Co. erected in Buffalo a very fine Blast Furnace, and contemplate the erection of another. The city is indebted to the enterprise of this firm for much of its present importance as a manufacturing centre.

In 1862 another large Rolling Mill was built in connection with the Blast Furnaces erected by Palmer & Wadsworth and Warren & Thompson, whose establishments have been consolidated under the title of the UNION IRON WORKS. The furnaces now in operation in Buffalo or in course of erection will have a capacity sufficient to produce 50,000 tons of Pig Iron annually. The ores are obtained from Northern Michigan.

The "Niagara Steam Forge," built by Charles Delaney in 1850, and now owned by HENRY CHILDS, is fully equipped for fabricating masses of wrought iron. This establishment has the capacity of turning out $200,000 worth of work annually. Another forge is now in the course of erection in Buffalo.

The manufacture of Machinery and Steam Engines is also largely carried on in Buffalo, much more so than the returns of the census-takers would lead one to suppose. The "Shepard Iron Works," for instance, have a capital of $125,000, and their annual product must amount to $200,000. The buildings of the works were erected in 1847, and consist of a brick foundry and machine shop 120 feet square, and a boiler shop adjoining 100 feet square. Here, in 1850, Mr. JOHN D. SHEPARD built the machinery for the propeller "Buffalo," and attached a screw propeller wheel of 16 feet in diameter, the shaft just touching the water when the wheel was loaded to ten feet. Although a failure was confidently and generally predicted, the experiment was entirely successful, and the reputation of the elevated screw propeller wheel established. Here too have been built several of the very best steam engines on the Lakes, and the boilers of some of the largest passenger boats, as for instance those of the "Southern Michigan," "Northern Indiana," "Crescent City," "Queen of the West," "St. Lawrence," and others. In addition to the manufacture of machinery for steamboats and propellers, the Shepard Iron Works make all kinds used in Saw and Flouring mills.

The "Buffalo Furnace," George W. Tifft owner, and J. N. Tifft & Co. lessees, and the Eagle Iron Works of Dunbar & Howell, are also extensively engaged in building Engines and Boilers; while MASON & BIDWELL have every facility for building vessels of the largest size. This firm and their predecessors have built Steamers, Propellers, Brigs and Schooners that have an aggregate tonnage of at least 50,000 tons. Some of the finest craft on the Lakes, and strongest steamers ever constructed, were built at the shipyards of this firm.

Leather.—Buffalo has peculiar advantages for this manufacture, and has more capital invested in it than in any other branch. The Tanneries of BUSH & HOWARD and AARON RUMSEY & Co. are the largest in Western New York.

Mill Stones and Mill Furnishing.—The establishments in Buffalo for furnishing mills are probably the largest of their class in the country. At JOHN T. NOYE's Mill Stone Manufactory, for instance, a person who desires to construct and equip a Mill, can obtain every thing, from a steam engine to the bolting cloths. He has simply to send a statement and diagram of the situation, size desired, and other particulars, and the entire mill, except the buildings (and the designs for these are frequently included), will be furnished. We know of no other establishment of the kind so complete in all its appointments.

Mr. Noye is also distinguished as an inventor as well as a manufacturer. His *Centrifugal Feeding Portable Mill* has effected a revolution in the ideas of millers as to the relative value of large and small stones. He commenced the manufacture in 1852, and such were the prejudices of old millers against small stones, that the sales during the first year did not exceed a half dozen mills. One after another, however, was induced to test the experiment, and found the results eminently satisfactory. Brown & Smead, at their steam mill in Portage, N. Y., found that by means of Mr. Noye's improvement they could make a hundred barrels of flour with only one and a half cords of wood; and O. Whitney & Co. at their large steam mill in Detroit did the same work with one ton of bituminous coal. What was then an experiment has now become a fixed fact, namely, that portable mills with the centrifugal feeding principle can be run (say three feet stones) with an economy of power over large stones of from twenty-five to thirty-three per cent.; and the flour, from its superior liveliness, is preferred by bakers.

Mr. Noye is also the inventor of an improved Bolting Reel, a Pressure Mill, a Plantation Corn Mill, a Smut Machine and Separator, a Centre Vent Turbine Water Wheel, a Chinese Sugar-Cane Mill and Sugar Mill Horse-Power, and other contrivances that exhibit the fertility of his genius and his skill in the adaptation of mechanics to useful purposes.

ZADOCK G. ALLEN & Co. are another firm in Buffalo extensively engaged in making Burr Millstones and furnishing Mill Machinery. Mr. Allen has had a long experience both as a millwright and a manufacturer. He is also an inventor, and his *Improved Cast Iron Water Wheel* is believed to be the best now in use. It is cast whole, and finished in a lathe by boring the eye and turning the rim, and its quick and steady motion adapt it for milling purposes, as the stone can be driven to the proper speed with but little gearing. His *Combination Smut Machine* and *Improved Self-Acting Flour Packer* are labor-saving machines that are also deservedly appreciated.

E. P. **Butler**, the other manufacturer, is the successor of Weston, Cogswell & Co. His Mills are peculiar in the novel method of hanging the stones, Mr. Butler having a patent upon the iron work employed for that purpose.

Pianos, Melodeons, etc.—Instead of there being but three establishments engaged in the manufacture of Musical Instruments in Buffalo, as the census takers have reported, there were four Piano manufactories in operation in 1859–60, those of A. & J. **Keogh**, H. **Utley**, **Froboes** & Co., and **Kurtzman** & **Linge**. Besides these, there was the Flute Manufactory of **Sheppard** & **Cottier**; the Organ Manufactory of G. **House**; and the Melodeon Manufactory of **George** A. **Prince** & Co.; that usually employs 200 hands, and turns out 80 instruments per week, ranging in price from $35 to $350. This is one of the largest establishments of its class in the United States. The manufactory is built in the form of an L, five stories in height, and has a frontage of 120 feet on two streets, and 40 feet in breadth. Nearly 30,000 instruments have been sent out from this manufactory to all parts of the country.

Platform Scales.—The manufacture of Platform Scales in Buffalo was in its infancy in 1860. In September of that year Mr. **John Weeks**, formerly Agent of the Messrs. Fairbanks, succeeded in organizing the **Buffalo Scale Works Company**, with Mr. **Edward** S. **Rich**, a gentleman of capital, as its President; and the business, now established on a solid foundation, will probably become an extensive one.

Stove Founding.—We are confident that this branch of manufactures is much understated in the census returns. The works of one firm, Messrs. **Jewett** & **Root**, have the capacity of melting 40 tons of iron daily, and turning out 1500 Stoves per week. They alone usually employ about 400 men. Their works, in connection with the Eagle Iron Company's manufactory, owned in part by the same proprietors, occupy an entire block. The principal moulding room is 200 feet in length by 150 feet in width, and contains two cupola furnaces; and the other is 200 by 100 feet, and has one cupola. The firm has been established since 1835.

Messrs. **Wood**, **Hubbell** & Co. are another firm extensively engaged in the manufacture of Stoves. They make over a hundred different kinds and sizes.

Wine.—We presume the establishment alluded to in the census returns as manufacturing Native Wine is that of **Turner Brothers**, who make *Turner's Ginger Wine*, of which over 300,000 gallons have been sold in a single year. They make 23 different kinds of Wines and Cordials, and furnish employment to a large number of persons during a portion of the year in gathering fruits and berries, of which the consumption is enormous. In connection with the Buffalo house, which has been established about 18 years, this firm have a manufactory in the city of New York, and another in San Francisco. Their wines are a staple article, and are shipped largely to Europe, the West Indies, and South America.

White Lead.—There are two White Lead factories in Buffalo, those of THOMPSON & Co., founded in 1843, and the Niagara White Lead Company, established in 1852—G. T. WILLIAMS, President, and S. G. CORNELL, Secretary. Each of these makes about 1200 tons of White Lead per annum, and the aggregate product, instead of being $63,000, as returned by the census-takers, is about $300,000.

Buffalo has for several years contained, in the establishment of F. S. PEASE, one of the largest and most noteworthy Oil manufactories in the Union, but recently important additions have been made to this branch of manufactures by the erection of several establishments for Refining crude Petroleum. We believe there are no less than eleven of these Oil Refineries now in operation in Buffalo.

Manufacturing Centres of New-England.

PORTLAND, MAINE.

PORTLAND, which is the principal seaport of Maine, and the capital of Cumberland County, is a manufacturing city of some importance, though it contains no very remarkable manufacturing establishments. In 1860 the County of Cumberland had 334 manufactories, whose united capital was $2,898,263, and who employed 2,699 males, 592 females, and produced a value of $6,091,924. More than one-half of these manufactories were located in Portland and the adjoining town of Westbrook, and they produced more than three-fourths of the aggregate product, or $4,794,520. The principal manufactures were the following:

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Brick	19	$16,618	$20,130	130		$53,294
Boots and shoes	22	56,150	107,551	256	123	226,751
Brewing	3	8,420	18,887	14	1	31,019
Boat building	6	5,450	3,548	20		14,150
Bindings and linings	1	20,000	13,035	16		30,000
Cotton goods	4	280,000	236,545	140	270	597,500
Cabinet furniture	2	16,000	36,010	81		78,725
Bedsteads	2	6,300	875	12		8,420
Carpets.	2	8,000	19,910	26	11	42,000
Carriages	23	64,200	27,080	180		149,855
Clothing	3	2,200	13.100	4	32	26,200
Coffee and spices (ground)	1	4,000	15,910	4	3	20,536
Distilled liquors	1	50,000	105,325	10		147,500
Flour and meal	28	120,250	351,851	66	2	366,733
Gun powder	2	216,000	120,000	46		237,500
Iron railing	1	10,000	4,400	15		31,000
Machinery, engines, etc	5	263,600	296,400	377		439,300
Musical instruments	4	33,000	5,255	18		25,800
Morocco	2	9,000	17,478	12		42.400
Mastic roofing	1	1,400	10,195	4		18,000
Meats, cured	3	52,100	52,807	14		60,736
Paper	2	165,000	174,600	59	58	305,000
Preserved fish	1	25,000	30,000	15	6	50,000
Pottery ware	4	5,800	3,458	23		37,150
Soap and candles	3	5,900	15,292	11		28,930
Sawed lumber	44	153,600	87,560	138		182,360
Sails	7	7,500	22,811	24		41.004
Stoves	1	30,000	12,000	30		40,000
Ship building	2	32,000	22,000	37		47,000
Sash, doors and blinds	1	6,000	39,100	10		48,250
Sugar refining	1	400,000	1,315,000	200		1,350,000
Leather.	12	96,050	169,945	117		255,699
Woolen goods	2	28,000	60,000	26	37	135,500
Wire	3	40,000	29,130	39		52,326
Wool cleaning	2	30,000	125,000	26	2	146,876

(1) The two largest manufacturing establishments in Portland are the Portland Company's Locomotive Works, JOHN SPARROW, Superintendent, and the Sugar Refinery of J. B. BROWN & SONS.

Next to Portland, the most important seat of manufactures in Maine is LEWISTON. The water-power here, which is among the best in New England, is owned by an association of capitalists called the "Franklin Company," of which A. D. Lockwood is Agent, and Edwin Atkinson, Treasurer. This Company have also a Cotton Mill with 21,000 spindles, and a Bleachery capable of bleaching six tons of goods per day. The other principal cotton mills are the Bates Manufacturing Co.'s Mills (Benjamin C. Bates, Treasurer, and D. M. Ayer, Agent)—capital $800,000, spindles 36,000, looms 812; the Hill Manufacturing Co.'s Mills (F. L. Richardson, Treasurer, and J. G. Coburn, agent)—capital $1,000,000; the Androscoggin Mills, which have about 40,000 spindles (A. D. Lockwood, Agent, C. Greene, Superintendent); the Porter Mill (R. A. Budlong, Agent); and the Lincoln Mills. Flannels and Cassimeres are made by the Lewiston Falls Manufacturing Co. (S. Pickard, Treasurer, and John M. Frye, Agent), and Bags by the Lewiston Bagging Company, who manufacture about 2500 grain sacks daily. Machine Cards are also made largely by J. Smith & Co., Bobbins and Spools by J. G. Drew, and Roller Coverings by H. H. Dickey. The Flour Mills of Bradley & Co. are probably the largest in the State. Besides these, there are machine shops, and two or more extensive saw mills.

BANGOR, situated on the west bank of the Penobscot River, at the head of sloop navigation, is principally noted for its extensive trade in Lumber. The head waters of the Penobscot traverse immense forests of pine, spruce, and hemlock, and its banks are lined with Saw Mills, converting the logs into lumber, which is floated down to Bangor. The principal industrial concerns of the city are therefore engaged in wood-working, and include firms like Blunt & Hinman, Babb & Strickland, Palmer & Johnson, Stetson & Co., Eddy, Murphy & Co., Morse & Co., John Dole, Watson Dyer, Paul D. Hartshorn, Oliver P. Merryman, and the Furniture manufactories of John Carlisle, Albert Dole & Co., Dole & Gilman, and George W. Merrill; the Barrel manufactories of Samuel Doyen, Farris & Webb, Amos M. Roberts & Son, and E. H. & H. Rollins. Carriages are made by Benjamin Adams, B. N. Thombs, and Whiton & Yeaton, and Harnesses by Jona. Batchelder, Stanford T. Chase, Geo. H. Chick, and John Williams & Son. There is also a manufactory of steel Squares (Darling & Schwartz, proprietors), two of Stoves (Eastes & Whittier and Isaac L. Johnson, proprietors), one of Saws (M. Schwartz, proprietor), and of Axes (Jefferson Higgins, proprietor); and of Files (Job Collett, proprietor); besides these, there are two Machine Shops (Muzzy, Franklin & Co. and Hinckley & Egery, proprietors); two Brass foundries (Geo. T. Allamby and Jona. Burbank, proprietors); and several manufactories of Clothing, Sails, Tinware, Confectionery, etc.

MANUFACTURES OF BOSTON.

[The following are the Census Statistics of the principal manufactures in the County of Suffolk, Massachusetts, which includes Boston and Chelsea, for the year ending June 1, 1860 :]

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Bed springs	4	$4,600	$16,992	20	......	$43,500
Billiard tables	4	50,500	27,055	25	......	53,500
Blank books and book-binding	13	74,900	211,084	157	292	418,500
Boots and shoes	48	166,200	119,371	311	38	370,932
Boxes, paper	9	25,650	57,820	40	78	120,000
Bread, crackers, etc	20	96,400	363,682	156	23	515,106
Brass founding	10	155,800	161,125	122	......	317,900
Brass cocks and guages	7	150,500	142,848	172	......	299,446
Camphene	6	83,000	656,929	22	......	729,040
Caps	5	32,500	19,950	10	47	51,000
Carriages	8	54,500	32,111	115	......	95,100
Casks and barrels	6	31,000	26,637	53	......	93,438
Chemicals	3	15,500	26,630	9	......	45,100
Cigars	11	18,700	32,817	38	9	64,516
Cloaks and Mantillas	10	86,300	228,775	12	273	462,460
Clothing	61	1,078,300	2,482,628	1324	2693	4,567,749
Coffee mills	4	33,000	244,359	19	8	268,900
Confectionery	11	83,100	148,944	84	163	365,900
Copper smelting	1	300,000	465,000	55	......	600,000
Copper smithing	12	273,100	243,253	201	......	427,290
Cutlery	2	13,500	1,690	18	......	30,000
Drugs and medicines	11	98,000	127,800	58	17	280,952
Flour	2	25,000	114,600	5	1	126,360
Furniture (1)	29	290,200	348,684	372	14	737,845
Furniture, school	5	51,900	40,990	177	......	161,800
Furs	6	49,000	172,550	34	21	269,000
Gas	4	1,383,000	258,970	232	......	608,733
Glassware	3	310,000	94,436	296	51	362,506
Hats	7	45,500	51,935	138	30	183,500
Horse shoes	3	900	7,185	16	......	13,900
Iron work, building	1	8,000	18,728	40	......	40,000
Iron founding	5	261,000	279,070	322	......	680,000
Iron railing	6	23,500	53,350	32	......	83,700
Iron, rolled	2	470,000	1,093,600	400	......	1,460,000
Iron safes	6	142,000	133,108	115	......	290,980
Iron shafting	1	20,000	59,000	40	......	86,500
Iron steamships	1	190,000	585,050	300	......	914,700
Iron work, ornamental	1	20,000	18,000	60	......	75,000

(1) The manufacture of Furniture is a very prominent and extensive business in Boston, and we have no doubt that the firms of DANIELS, KENDALL & CO., FORSTER, LAWRENCE & CO., HALEY, MORSE & BOYDEN, F. M. HOLMES & CO., H. T. ABORN & CO., C. A. GARDINER & CO., BUCKLEY & BANCROFT, KIMBALL & CO., and WINAND TOUSSAINT, make annually considerably more than the Census marshals have returned for 29 manufactories.

Manufactures.	No. of Establishments.	Capital invested.	Raw material.	Male hands.	Female hands.	Value of product.
Instruments, mathematical	2	$13,000	$7,000	9	......	$24,500
Instruments, surgical	1	15,000	855	5	......	10,000
Instruments, telegraphic	1	20,000	9,000	15	......	20,000
Japanned ware	2	8,000	6,400	22	......	19,500
Jewelry	9	14,050	15,653	31	1	43,800
Lasts	5	14,905	5,313	44	......	53,395
Leather	7	103,000	384,235	143	......	673,250
Leather belting	1	9,500	19,400	9	......	37,600
Liquors, distilled	5	266,000	688,020	24	......	766,000
Liquors, malt	6	118,500	123,570	65	......	236,604
Locomotives, etc.	1	25,000	31,450	80	......	80,000
Lumber, planed	6	74,600	670,650	81	......	807,250
Machinery, st'm-engines, etc.	28	646,100	400,606	650	......	972,650
Marble	22	242,200	242,841	454	......	501,800
Masts	3	56,000	37,550	29	......	93,000
Matches	1	30,000	23,450	8	60	65,000
Military caps	1	4,000	10,000	16	2	30,000
Millinery	18	44,500	122,550	10	157	238,456
Mineral waters	5	47,000	31,128	52	......	122,774
Musical instruments,						
Miscellaneous (1)	4	88,200	24,249	111	......	144,100
Pianofortes	16	823,000	515,768	730	......	1,461,500
Oil, linseed	3	400,000	805,200	96	5	957,500
" lard	2	32,000	122,500	18	......	149,850
" water	1	6,000	15,800	3	......	20,000
" kerosene	4	280,000	428,439	166	......	883,500
" whale	2	55,000	108,640	11	......	128,110
" curriers'	1	4,000	6,283	2	2	8,500
Paper hangings	2	22,500	20,750	29	3	56,500
Picture frames	15	64,700	96,610	107	......	183,600
Preserved pickles and fruit	2	70,000	122,100	45	42	177,250
Printing, book and job	23	285,200	381,396	308	54	659,522
" newspaper	77	1,176,500	790,137	743	150	1,703,280
Printing presses	1	200,000	30,180	100	......	103,500
Pumps and blocks	6	23,700	14,000	31	......	40,300
Rigging	2	20,600	22,548	28	......	46,000
Roofing, composition	5	14,100	29,780	34	......	66,000
Roofing, slate	1	12,000	57,600	20	......	70,000
Saddlery and harness	23	74,000	104,336	178	9	216,310
Sails	13	20,200	59,060	46	......	92,280
Salt (ground)	3	60,000	37,190	14	12	75,000
Saltpetre	1	3,000	18,000	......	2	23,500
Sash, doors and blinds	4	10,900	13,235	25	......	27,800
Sewing machines	5	236,000	57,405	451	5	1,045,000

(1) The manufacture of Musical Instruments, exclusive of Pianofortes, is a more extensive business in Boston than the census returns indicate.

MASON & HAMLIN'S manufactory of Cabinet Organs is the largest of its kind in the Union. They have the capacity of making a hundred a week, or five thousand a year.

E. & G. HOOK employ in their Organ Manufactory at Roxbury 50 hands, and for the last three years have averaged 22 Church Organs annually, some of them very large.

W. B. D. SIMMONS & Co. have also an extensive manufactory of Church Organs on Charles Street. Besides these, we find in a late Directory the names of S. D. & H. W. Smith, William Stevens, Walter Crosby, George Freemantle, Graves & Co., Charles W. Lawrence, Benjamin F. Richardson, Charles Stumcka (Guitar), the Wright Musical Instrument Company, White Brothers, and James H. White, as manufacturers of musical instruments, exclusive of the Pianoforte manufacturers.

system in South Boston. He made it a practice never to part with good workmen if he could possibly retain them, and frequently kept a large force of hands on half-pay when their services were not needed. Admiral Dahlgren has said of him—"He possessed that rare quality, sagacity, which constitutes in truth the highest attribute of the intellectual man, and enabled him to arrive at results which others sought by disciplined study and often in vain."

After his decease in 1856, Mr. Francis Alger, his only surviving son—who has since died while these pages were passing through the press—succeeded him. Mr. Francis Alger brought to the business a thorough training, a cultivated mind, and a taste for the pursuits in which he was engaged, besides a knowledge of Metallurgy. Aside from his connection with the Foundry, Mr. Alger was eminent as a scientific man, and as the author of "*Alger's Philips' Mineralogy.*" He possessed one of the finest and most extensive Cabinets of Minerals in America, comprising specimens from all parts of the world.

In 1862 he obtained patents for two improved Fuses, each combining a time-fuse and a percussion-fuse in one case, adapted to shells for rifled guns. One of the most novel and valuable principles embraced in these patents is that in case the shell strikes any object when fired from a gun, previous to the fuse having been consumed, the fuse is driven forward by the concussion, and then allows free egress of the fuse-flame to the charge in the shell, thereby causing its immediate explosion.

The following year he patented the use of a pouch to contain the bursting charge to be used in shrapnel. In this the powder in the form of a cartridge was combined with the fuse, thus rendering the process of charging these shells much more expeditious and less dangerous than by the usual method of first filling the shell with loose powder and then inserting the fuse. These pouches also protect the powder from dampness, being impervious to moisture.

During the present rebellion Mr. Alger has frequently been called to Washington, and received large and urgent orders for projectiles of every description, particularly the rifled shot and shells, and for the "Schenkl projectile." He also obtained large orders for 9-inch and 11-inch Guns and Bronze Cannon both for the Army and Navy.

In order to meet the demands of government for Ordnance, the company have been induced to erect an additional Foundry, 125 feet long and 114 feet wide, and a large Machine Shop, specially designed for finishing guns of very large calibres.

This new "Ordnance Foundry" was put in operation in March, 1863, and the first work performed in it was the casting of a 10-inch Army Columbiad, according to the system of Major T. J. Rodman, of the

United States Army. After having cast five 10-inch Guns in this way satisfactorily, preparations were then made to also cast 15-inch Guns after the same method, and the work on guns of this calibre was commenced in June, 1863. Forty tons of metal are required to cast a gun of this size, and a description of the processes may interest our readers.

In the centre of the room is sunk a cylinder of three-quarter inch iron, water tight, and twenty-five feet deep. On the inside is placed a wall of brick 16 inches thick. The cylinder is thirteen feet four inches in diameter. In the centre of this is placed a heavy cast-iron flask six feet six inches in diameter. Upon the inside of the flask is placed a layer of clay and other materials, bearing in the centre the form of the casting required. When this is made as smooth as possible, the core is inserted, and suspended in its required position by a heavy iron frame resting upon the top of the flask. This core-arbor is formed by a cast-iron cylinder of 13 inches in diameter, turned and fluted on the outside. Around it is wound a small rope, plastered with loam, about an inch thick. This core-arbor is made perfectly water-tight, with the exception of having two orifices—one to force water in, the other to let it out. The Cochituate water is discharged through the core at the rate of forty gallons per minute. The object is to cool the gun from the inside to the outside, and prevent an unequal contraction of the metal. The utmost care is required in all these operations, defects in which might produce disastrous and fatal consequences. The metal is prepared in two air furnaces, each capable of melting 25 tons. When all is ready, and about 15 men are placed in their required position, the order is given, the furnaces are tapped, and the molten iron flows into the flask. One hundred and twelve hours are required to cool the gun so that it can be removed. On account of the risk incident to the casting, spectators are seldom admitted to the works during the operation.

The South Boston Iron Company have manufactured for the Government since the commencement of the present rebellion an immense amount of ordnance and projectiles. It has been remarked by those best qualified to judge, that had it not been for the South Boston works and the works at Pittsburg, a supply of the materials and enginery of war, which was furnished promptly and continuously by them, could not have been otherwise obtained in the United States in two years.

The present number of men employed in these extensive works is four hundred, and gangs are kept working night and day. The same system, adopted by Mr. Cyrus Alger, of retaining men through a series of years, often keeping many on half-pay when their services were not needed, has secured for this Company an unexcelled force of employees who fully understand the requirement of every department of labor in which they are employed.

The City Point Works—Harrison Loring, Proprietor,

Is another of the manufacturing establishments of South Boston that may be said to have attained a national reputation.

The founder of these works, Mr. Harrison Loring, though a young man, has achieved a highly honorable fame in his department of mechanics. He was born in Duxbury, Massachusetts, and served his apprenticeship with Mr. Jabez Coney, of Boston. Having passed a season in Cuba superintending the erection of engines and machinery, he returned to Boston, and in 1847, at the age of 22, commenced business for himself, not however without capital, for he was tendered by relatives a loan of $20,000, without security—a mark of confidence no less creditable to their sagacity than complimentary to himself.

For several years after commencing business Mr. Loring's operations were confined principally to building Stationary and Marine Engines and Boilers, though including Sugar Mills and Paper Mills Machinery, Iron Light Houses, and a great variety of other general work. He was among the first to foresee the great demand which must eventually come for Iron sea-going Steamships, and immediately set about making the proper arrangements to carry on this manufacture quite extensively, in addition to his other branches, which had been gradually increasing. Accordingly, in 1857, he made application to the city of Boston to purchase the House of Industry estate, then unoccupied,—which application stated that he would agree to carry on the business of Iron Ship buildfor not less than five years, and would employ not less than three hundred workmen. After much opposition from some of the capitalists of Boston he finally effected the purchase of this estate, consisting of seven acres of upland and a million feet of flats, and prepared it for the purpose by remodelling the old and erecting such new buildings as the business required.

This being the first Iron Ship Building establishment which had been permanently established in New England, there were many who expressed their distrust as to the success of the enterprise, and even some of the capitalists of Boston, who wanted work of this kind, seemed determined to place the new concern in the closest competition with the older concerns of other cities, and giving them the preference over the home establishment. Notwithstanding all these obstacles however, which to some men of less strength of character would have been insurmountable, Mr. Loring pursued his business with all the energy and steadfastness of purpose, which have characterized his career, by building steamers for foreign markets. Even in the years 1857–8, when almost all kinds of industry were suspended, Mr. Loring kept his establishment in full operation on vessels to go to India. He then made a contract with the Boston and Southern Steamship Company for two Iron Steamships of 1,150 tons each; and unlike the most of contracts of a later date, these two vessels—the "South Carolina" and "Massachusetts"—were completed and delivered on the very day named for their completion. They were afterwards sold to the U. S. Government, and proved to be among the most successful vessels in the blockading squadron on the Southern coast.

Mr. Loring has since built for the Union Steamship Co. of Boston two Iron Screw-Steamships, the "Mississippi" and "Merrimack," of 2,000 tons each, which have given the greatest satisfaction to the Company and are ornaments to the merchant-marine of the country. He has also done a large amount of work for the United States Government, including machinery for sloops of war, side-wheel and screw gun boats. After the manifest success of the "Monitor" over the Rebel iron-clad "Merrimac," and the Government had decided to build more Monitors, Mr. Loring's establishment was called upon to build as many as could be completed in a short time, and he immediately commenced on one, the "Nahant," which was one of the first of her class that was completed, and the first Monitor ever built in New England. The novelty of her construction attracted daily hundreds of visitors to examine her. While fitting the Nahant for sea Mr. Loring laid the keel for another Monitor called the "Canonicus." This vessel embodied all the improvements that suggested themselves while constructing the first, having a much superior deck and a thicker side-armor. She is a powerful Ram, and has more than double the propelling power of the Nahant class, and much superior in many other important points. Although the "Canonicus" was delayed in her construction by additions and alterations demanded by the experience of these vessels, when under heavy fire, to resist the modern projectiles, she was the first one completed of her description, and will doubtless sustain the reputation which the City Point Works have attained for excellent workmanship, as the government officials who were on board during her trial-trip expressed themselves in language of unqualified praise for her sailing qualities, her wonderful strength, and the completeness of all her appointments.

The City Point Works are located at nearly the end of the peninsula of South Boston, about one mile from the city proper. They have a water front of six hundred feet, upon which are built two spacious ship-houses. The machine shop is the structure formerly used by the city as the House of Industry. It is built of unhewn granite, is four stories high, and about three hundred feet in length. From 500 to 700 skilled artisans now ply their tools here both day and night.

The Globe Works,

Located on Foundry Street, are also entitled to rank among the noteworthy and remarkable manufacturing establishments of South Boston. Probably a greater variety of machinery has been built in these works than in any other, for it has been the practice of the Company to change their appliances and adapt their tools to the kind that may be most in demand in a given time, whether it be Sugar Mills, Locomotives, or Steamships.

In 1846, Mr. John Souther, who is now President of the Company, commenced business as a Locomotive builder near the site of the present works in association with Mr. J. Lyman (whose interest however he soon after purchased), on the unprecedentedly small capital of $2,000. Previously to embarking in this enterprise Mr. Souther had spent seven years in the service of the Boston Locomotive Works, and had made all or a greater part of their first models and patterns. He had also spent two years at Cuba studying the wants of the sugar planters, and in endeavoring to ascertain the machinery best adapted to supply those wants. The advantages of this practical and comprehensive training soon became manifest in the success of the establishment he had founded, and the sugar machinery built here for Cuba alone has amounted in value to $200,000 annually.

In June, 1854, the Globe Works Company was incorporated, with John Souther as President, and D. A. Pickering, Treasurer. The latter gentleman had been, previous to his connection with these works, General Superintendent of several railroads, and had acquired a large and varied experience that peculiarly fitted him for the position he now occupies. For several years the building of Locomotives was a prominent item in their general business, from twenty to thirty having been made annually. Since 1860, however, when the works were destroyed by fire, the building of Locomotives has not constituted an important branch of their manufactures.

One of the most novel machines built at these Works is the Steam Shovel or Excavator, the construction of which has become an extensive business. These Shovels have been used on most of the railroads in this country, and on many European railroads. They hold two cubic yards of earth, make two dips in a minute, and will dig the hardest clay pan. They will fill a train of twenty-five cars in twenty-five minutes. The shovel weighs twenty-eight tons. Its movements are wonderful in their complicated harmony, and it has been said to approach nearer to "a thing of life" than any other large machine ever built. It has distinct motions to draw the shovel back, force it forward into the bank, to raise it up, to swing it to the right or left over a car, and to drop the contents—all executed by steam power. The Company have applied this machinery to a boat for dredging docks, rivers, and harbors, which is used in many parts of the United States and the Canadas, and also by the Russian and Egyptian governments on the Amoor river and on the Nile. The iron boats for this machinery were built at the Works, and both boats and machinery compare favorably with those for the same purposes built in Europe. A second order was given by the Pacha of Egypt to the Globe Works.

For the last two years the Company has been largely engaged upon work for the United States Government. They constructed the U. S. steamship "Housatonic," and are now (1863–4) building one of the Monitors, both the hull and machinery, and also the machinery for a sloop-of-war and two side-wheel war steamers. The working force of the Globe Works has been about 400 men; it is now increased to 600.

Recently Mr. Aquila Adams has erected in close proximity to the Globe Works a new Foundry and Machine Shop, the main building of which is 235 feet long and 50 feet wide, with two wings, each 60 feet in length, besides blacksmiths' shops, etc. Mr. Adams is now building one of the Monitors for the Government, and gives employment to about 200 men.

Besides these establishments, there are in South Boston the Rolling Mills of the Bay State Iron Co. (Reed & Hooper), recently enlarged, the Glendon Rolling Mills (Oliver Edwards, President), the Pembroke Forge Co. (Wm. E. Coffin & Company), and the Norway Iron Works (Naylor & Company). In East Boston are the Shipyards of Donald McKay, Paul Curtis, Sam'l Hall, Robert E Jackson, and John Taylor; the Atlantic Marine Engine Works; and the Boston Steam Engine Co.; in Charlestown are the Machine shops of Hittinger, Cook & Co. and Thomas Cunningham;—and throughout the city and its suburbs are numerous establishments engaged in various manufactures of Iron and Machinery. Among those that deserve honorable mention are the Machine Shops of Smith & Lovett, A. Sylvester & Co., Hinkley, Williams & Co., Clogston, Parker & Gordon, S. E. Chubbuck & Son, and others; the Fulton Iron Foundry; the Foundry and Safe manufactories of Denio & Roberts. and G. W. & F. Smith; the Saw manufactories of C. Griffiths & Co. and Henshaw & Co.; the Printing Press manufactories of the S. P. Ruggles Company and R. Hoe & Co.; the Furnace and Range manufactories of Levi Chubbuck, Gardner Chilson, Walter Bryent, and Charles H. Spence & Co.; the Stove foundries of Moses Pond & Co., B. W. Duncklee & Co., Cyrus Carpenter, Pond & Dunklee, Wm. White, Bowers, Pratt & Co., Seavey & Co., Matthias Ellis, Wm. E.

Smith & Co.; the Shawmut Wire Works of Farran, Follet & Co.; the Ashcroft Water Guage Company; the Boston Ornamental Iron Works of Mauran & Tuck; the Lead Pipe Works of George L. Stearns and J. H. Chadwick & Co.; the Type foundries of Phelps & Dalton and Daniel W. Rogers; the Wrought-Iron Tube Works of James J. Walworth & Co.; the American Tube Works—and others.

Boston, with the exception of New York, has a larger number of Pianoforte manufactories than any other city. Amongst the firms engaged in this branch are the well-known names of Chickering & Sons, T. Gilbert & Company, Hallet, Davis & Company, Hallet & Cumeston, Allen, Adams, Vose, Emerson, McPhail, Ladd, and others. The manufactory of Chickering & Sons is among the very largest of its class in the world. It is built in the form of a hollow square, enclosing a spacious court, and fronts on Tremont Street 245 feet, with wings 262 feet in length—the width of the whole being fifty feet. Three millions of bricks, 9,000 perch of stone, 1,605,000 feet of lumber, 300 casks of nails, and 11,000 panes of window-glass, were required to construct it. Over 400 men are employed in the establishment, and about 2000 Pianos are annually manufactured.

Grover & Baker's Sewing Machine Manufactory is another of the large manufacturing establishments of Boston. This is a brick structure 4 stories in height, located on Washington Street, corner of Waltham, having a front on the former of 60 feet, and a depth of 200 feet. Here are employed about 350 workmen, who with the aid of the most approved machinery manufacture daily about one hundred Sewing Machines, which is scarcely adequate to the demand. The success of this Company is due to the popularity of their new-style of stitch, possessing peculiar and distinctive characteristics, invented and patented by W. O. Grover and William E. Baker in 1852, and to the business ability of Orlando B. Potter, the President and chief manager.

The manufacture of Firearms is represented by the "Spencer Repeating Rifle Company," who are actively employed in manufacturing a peculiar style of Rifle and Carbine patented by a young Boston mechanic in 1860. In loading, seven cartridges are deposited securely in a magazine at the "butt" of the gun, and an ordinarily-skilled marksman can discharge them all in twelve seconds, and a platoon of soldiers can fire with good aim at the rate of once every three seconds. The cartridge is metallic, and is fired without the use of caps. The Armory is located in Chickering's building, on Tremont Street, where about 300 men are constantly employed in manufacturing Carbines for the government.

The leading manufacturing interest in Boston, as the census statistics show, is that of Ready-Made Clothing. There are about sixty firms engaged in this manufacture, some of whom, like Beecher, Beard & Co., Bliss, Whiting, Pierce & McKenna, Chamberlain & Currier, C. W. Freeland & Co., Huntington, Wadsworth & Co., W. R. Lovejoy & Co., Merritt, Parkhurst & Co., Stiles, Edmunds & Co., Whitten, Burdett & Young, do a wholesale business exclusively, whilst others combine all departments. Of the latter class perhaps the best representative is the firm of George W. Simmons & Co. There are but few readers of American newspapers who have not heard of the "Oak Hall" Clothing Store, which has been celebrated both in poetry and prose; and probably there are no residents of Boston, and but few visitors, whose attention has not been attracted to the building by its peculiar architecture. This store, which is really extensive, comprises a Custom Department, a Gentlemen's Furnishing Department, a Boys' Department, besides two rooms 120 feet each in length devoted to Men's Ready-Made Clothing.

Boston is also the commercial centre of a number of very important Glass manufactories, whose works are in the immediate vicinity. The Boston and Sandwich Glass Company employ about 500 hands, and make about 60 tons of Cut and Pressed Glass per week. The New-England Glass Company has probably the most complete establishment in the United States for the manufacture of all kinds of Glassware. Their Opal Glass is said to be superior to a great portion of that produced in Europe. Besides these, there are the Suffolk Glass Works (Joshua Jenkins), the Mount Washington Glass Works (Timothy Howe, proprietor), the Phœnix Glass Company (J. B. Callender, agent), the Union Glassworks (Amory Houghton, agent), the Bay State Glass Co. (S. Slocomb, agent), and the long-established Glass Manufactory of Thomas Cain & Son, to which we have elsewhere alluded. The manufacture of Silvered Glass is extensively carried on by Alonzo E. Young, and from its showy and effective appearance is in great demand.

Boston is the only place in the United States in which the manufacture of Watches is at this time successfully established. There are two Companies now engaged in it—the American Watch Co. (late Robbins, Appleton & Co.), having a capital of $300,000, whose works are located at Waltham; and E. Howard & Co., whose Manufactory is at Roxbury. This manufacture was commenced in 1850, by the Boston Watch Co., and though in its infancy the business shared the embarrassments that usually attend new enterprises, it is now successfully established, and about 75,000 watches are made annually—a quantity however that scarcely supplies the demand.

Gold and Silver Plate, and Plated Wares, are also extensively manufactured in Boston. The firms of Newell Harding & Co., established in 1821; of Crosby, Hunnewell & Morse; Homer, Caldwell & Co., Palmers & Batchelders, Rogers, Smith & Co., and Farrington & Hunnewell, have more than a local reputation.

In Boston and its vicinity there are a number of extensive Color and Varnish manufactories—the principal firms being Banker & Carpenter, Crocker, Wadsworth & Co., A. L. Cutler & Co., Merrill Brothers, and Stimson, Valentine & Co. The last named have a very extensive manufactory at Riverside, near Boston, where they produce about three hundred gallons of Varnishes daily.

Besides these, we might mention among the noteworthy manufactories of Boston and its vicinity, the Chemical manufactories of J. R. Nichols & Co., A. Cochrane & Co., W. F. Freeman & Co., and Hodges & Silsbee; the Chemical Apparatus Manufactory of Charles H. Wing; the Chocolate manufactories of Walter Baker & Co. and John Preston; the Ink Manufactory of Maynard & Noyes, whose inks have maintained a high reputation for over a quarter of a century; the Cordage manufactories of Sewall, Day & Co., Coverly, Frye & Co., N. Boynton & Co. and Scudder, Rogers & Co.; the Whipple File Co., whose Works at Ballardvale for making Files by machinery are the largest in the United States; the Brass Foundry of H. N. Hooper & Co.; the Penrhyn Marble Company; the India Rubber Belting Manufactory of Tappan, McBurney & Co.; and the Leather Belting factories of A. N. Clark & Co. and Edward Page & Co.; the Boston, Union, and Adams Sugar Refineries; the Soap and Candle manufactories of Southard, Herbert & Co., E. A. & W. Winchester, J. Morrill, Jr. & Co.; and the Boston Indexical Soap Company (George W. Safford & Co., agents); the Downer Kerosene Oil Works;—the number of noteworthy manufactories in fact is so large that it would be tedious to enumerate them.

Many of the great Dry Goods Commission and Jobbing Houses of Boston have a connection so direct and intimate with Manufacturing Companies, whom they benefit and sustain by their capital, experience and advice, that they might without impropriety be classed among manufacturers. To them New-England is largely indebted for her present pre-eminence in manufactures.

MANUFACTURES OF LOWELL.

Lowell, twenty-six miles northwest of Boston, has been called, not inappropriately, the "Manchester of America." The history of the first purchases made here in 1821, with a view to the establishment of manufactories, has already been alluded to in this work. There were in 1860 twelve incorporated Companies in Lowell that owned 54 Mills, including 2 Print Works, 1 Bleachery, 4 Dye Works, and Machine Shops, having a capital of $13,900,000, running 403,696 spindles, 12,190 looms, employing 8,405 females, 3,979 males, and produced per week 2,481,000 yards Cotton goods, 82,000 yards Woolens, and 25,000 yards Carpets. The total weekly consumption of Cotton in these mills was 823,000 pounds, and of clean Wool 75,000 pounds.

The Merrimack Manufacturing Company, which commenced operations in 1823, has six Mills and a Print works, a capital stock of $2,500,000, runs 87,408 spindles, 2,303 looms, employs 1,456 females and 695 males, and produces 430,000 yards of Prints per week. This company has been especially successful in the selection of their patterns, which are distinguished for neatness, comparing in all respects favorably with the best made in England. Isaac Hinckley has been Agent of the Company since 1850, and Henry Burrows is Superintendent of the Print Works.

The Hamilton Manufacturing Company, commenced in 1825, has 4 Mills and a Print Works, a capital of $1,200,000, runs 48,328 spindles, 1,382 looms, and in 1860 employed 850 females, 400 males, and produced weekly 235,000 yards of Prints, Flannels, Ticks, and Sheetings. The Prints are all madders in from one to six colors, and the weekly produce is about 120,000 yards. John Avery has been the Agent of the Company since 1831, and William Spencer superintendent of the Print Works since 1828.

The Lowell Manufacturing Company has a capital of $2,000,000, runs 7,156 Wool spindles, 8,448 Cotton spindles, 212 power Carpet looms, 274 other looms, employs 770 females and 500 males, and produced weekly 25,000 yards Carpets, 47,000 yards Osnaburgs, 32,000 yards Shirtings, and 5,000 yards Linseys. The Carpets consist of two and three-ply ingrain, and are excellent fabrics of their class both as respects make and permanence of dye. Samuel Fay is Agent of the Company.

The Middlesex Company has 4 Mills and 3 Dye Houses, employs a capital of $1,000,000, runs 16,340 spindles, 200 Broadcloth looms and

200 narrow, employed 730 females, 320 males, and produced weekly 6000 yards Broadcloth and 24,000 yards Doeskins, Cassimeres, etc. This Company uses annually 2,000,000 teasels, 1,200,000 pounds of fine wool, and 20,000 pounds of glue. Oliver H. Perry is Agent of the Company.

The LAWRENCE MANUFACTURING COMPANY has 5 Mills, a capital of $1,500,000, runs 58,624 spindles, 1,852 looms, employs 1,300 females, 800 males, and produced weekly 360,000 yards of Drillings, Printing Cloths, Sheetings and Shirtings. Wm. S. Southworth has been Agent of the Company since 1849.

The other Cotton Mills are as follows:

THE APPLETON COMPANY—3 Mills, capital $600,000, spindles 19,872, looms 700, females employed 400, males 120, weekly product 150,000 yards Sheetings and Shirtings, No. 14. George Motley has been Agent of the Company since 1831.

The SUFFOLK MANUFACTURING COMPANY—3 Mills, capital $600,000, spindles 21,986, looms 800, females employed 500, males 120, weekly product 162,000 yards Drillings, No. 14. John Wright has been Agent of the Company since 1842.

The TREMONT MILLS—2 Mills, capital $600,000, spindles 20,960, looms 760, females employed 550, males 130, weekly product 230,000 yards Sheetings and Shirtings. Charles F. Battles, Agent.

The BOOTT COTTON MILLS—5 Mills, capital $1,200,000, spindles 56,136, looms 1,536, females employed 870, males 262. Weekly product, 300,000 yards Drillings No. 14, Sheetings, Shirtings, and Print Cloths. Linus Child, Agent.

The MASSACHUSETTS COTTON MILLS—6 Mills, capital $1,800,000, spindles 58,440, looms 1,971, females employed 1,239, males 322. Product in 1860, 30,265,284 yards of Sheetings No. 13, Shirtings No. 14, and Drillings No. 14. Frank F. Battles has been Agent of the Company since 1856.

The LOWELL BLEACHERY has a capital of $300,000, employs 40 females and 360 males, and Dyes 15,000,000 yards and Bleaches 8,000,000 pounds per annum. Frank P. Appleton, Agent.

The LOWELL MACHINE SHOP has 4 shops, a smithy and foundry, employs 450 men, and produces Cotton Machinery, Paper Machinery, Locomotives, Machinists' Tools and Mill Work. Andrew Moody has been Agent of the Company since 1862.

The average wages of the females was in 1860 Two Dollars per week clear of board; and of the males Eighty Cents per day clear of board. The medium produce of a Loom of No. 14 yarn was 45 yards per day, of No. 30 yarn 33 yards; and the average per spindle was 1¼ yards per day.

In addition to the above, about 2500 hands are employed in other manufactures in Lowell, yielding products estimated at two million and a half of dollars per annum—the principal ones being the Woolen Mills of the Belvidere Company, of Chase & Hosford, and of Faulkner & Brother; the extensive Steam Saw Mills of Norcross, Saunders & Co., of Otis Allen, and of A. L. Brooks; the large Carriage and Harness Manufactory and Horse-Railroad Fitting Shop of Samuel Convers; the Foundry of Cole, Nichols & Wilson; the Machine Shops of Richard Kitson, S. Ashton, Thomas Atherton, McNish & Butler, Smith, Lawrence & Co., Calvert & Sargent, and B. F. Stevens; the Belting manufactories of Josiah Gates, Whitmarsh & Adams, and Solon Stevens; the American Bolt Co. and the Union Bolt Co.; the Bobbin and Shuttle Manufactory of Watson, Parker & Nichols; the Bedstead and Furniture Manufactory of T. B. Comins; and the Chemical Works of C. P. Talbot & Co. Electric Machines are made by William H. Burnap, Asahel Davis, and Moses Marshall; Sewing Machine Needles by Taylor & Probert; Wire Cloth by H. B. Hildreth; Wood-Working Machinery by H. B. Smith; Scales by Woods & Nute; Knives by Lovejoy & Butterfield; Gas Fixtures by H. R. Barker; Toilet Soaps by Robert & Edward Prince; and Sash, Doors and Blinds by many.

Last, but not least, we may mention the Laboratory of Dr. J. C. Ayer & Co., which is perhaps more widely known in this and foreign countries than any other manufacturing establishment in Lowell. This firm expend annually about $60,000 in advertising in newspapers, besides distributing gratuitously five million copies of an Almanac, which is printed by steam power in their own establishment, in the English, French, German, Portuguese and Spanish languages. As a consequence of this extended publicity, combined with the fact that the excellence of their preparations is supported by an overwhelming array of testimonials of a high character, the firm require annually in their manufacture 288,000 pounds of drugs, of the value of $457,000: 132,000 gallons of pure spirit, of the value of $130,000: and 354,000 pounds of sugar, costing about $60,180—making an annual expenditure for these three items alone of $647,180. Besides these, Messrs. Ayer & Co. use annually in their establishment 1,100,000 bottles, 1,720,000 pill boxes, 350,000 square feet of packing boxes, and 91,000 square feet of card board—while the cost of the paper and printing ink consumed is about $64,500 per year. Boxes are sent from this mammoth Laboratory to almost every quarter of the globe, at an annual expense to the firm for freight alone of about $20,000; and their expenditure for postage is about $2,500 per year—an amount probably exceeding that of any other firm in Massachusetts.

MANUFACTURES OF LAWRENCE.

LAWRENCE, in Essex County, ten miles below Lowell, is the last of the important manufacturing towns that have been erected on the banks of the Merrimac River. It is but seventeen years since it was incorporated as a town, and it now contains a population of over 17,000.

In 1844 several capitalists of Boston determined to build at this place a manufacturing city, and formed a company with a capital of $1,500,000, which was incorporated April, 1845, as the Essex Company, having the following officers as its first board—Hon. Abbott Lawrence, President; Messrs. Patrick T. Jackson, William Sturgis, Nathan Appleton, John A. Lowell, and Ignatius Sargent, Directors; and Chas. S. Storrow, Treasurer and Chief Engineer. This Company proceeded to erect a Dam at a cost of $250,000 across the Merrimac, giving a head and fall for the whole river of 28 feet, and a water power said to be equal to that at Lowell. From this dam they conveyed water for manufacturing purposes by a canal on the north side of the river, over a mile in length, 100 feet wide at the upper end, 60 feet at the lower, and 14 feet deep in the centre. The canal is parallel with the river at a distance of 400 feet, giving that space for Mill sites.

The first Mills erected were "The Atlantic Cotton Mills," by a company incorporated in February, 1846, with a capital of $1,800,000. The principal building is 570 feet long, consisting of a centre Mill six stories high with two wings five stories high. The Company have 45,000 spindles, employ 1200 operatives, and in ordinary seasons consume 80,000 bales of cotton.

In 1853 the Pacific Mills were incorporated, with a capital of $2,500,000. The factory buildings of this Company were at the time they were erected the largest in the country. The principal building is 800 feet long, six stories high in front and eight in the rear. The river building is 1000 feet long, with wings 310 feet and 225 feet, three stories high. This company has 110,000 spindles, 2,500 looms, and when in full operation employs 3,000 operatives, and produces goods to the value of nearly four millions of dollars annually.

The "Washington Mills," incorporated in 1858, have a capital of $1,500,000, and occupy the premises of the "Bay State Mills," which failed in 1857. The mills form a parallelogram of 1000 feet in length by 400 feet in breadth between the canal and river, and are, it is said, the largest in the world devoted to the manufacture of Fancy Woolen Goods. They employ about 2,300 operatives.

The Pemberton Company's Mills are built on the site of the old Pemberton Mills, which were destroyed in January, 1860, while in full operation, by the falling of the main building and subsequent fire, which involved the death of a large number of operatives. The new mills have been constructed with the most careful regard to architectural strength, and probably no factories in the country excel them in this particular. The present Company has a capital of $650,000, runs 30,000 spindles and 600 looms.

The "Everett Mills," incorporated in 1858, occupy the buildings formerly used as the Lawrence Machine Shop, which are 400 feet long and four stories high. This Company has a capital of $800,000.

The "Lawrence Duck Mill" was incorporated in 1853, with a capital of $300,000, and employs about 250 operatives.

Among the new enterprises of Lawrence we may mention the "Fibrilia Manufacturing Company," and the "Lawrence Woolen Company," which has been incorporated and is about going into operation. The Eibrilia Company is making Printed Carpetings, Rugs and Crumb Cloths, from prepared flax and wool, of which they have sold many thousands of yards.[1]

Besides these companies, Lawrence has three Paper Mills, those of William Russell & Son, S. S. Crocker, and Wilder & Co.; two manufactories of Leather Belting (Edward Page & Co. and E. W. Colcord, proprietors); two Iron Foundries, the "Merrimack Iron Foundry," (Bennett & Josselyn, proprietors), and Edmund Davis & Son; and four Machine Shops, those of Albert Blood, J. C. Hoadly & Co., Webster, Dustin & Co., and Henry Arnold. Patent Fliers for cotton machinery

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(1) Fibrilia is a new article for textile fabrics to be used as a substitute for cotton and wool, and susceptible of being spun or woven on cotton and woolen machinery. The principal plant used for fibrilizing is Flax, and the country is largely indebted to Stephen M. Allen, of Boston, for his persevering experiments in rendering this material available as a substitute for Cotton. Mr. Allen began his experiments in cottonising flax in 1851, but the first Mill provided with machinery for the purpose was one established by him in association with George W. Brown and J. C. Butterworth in 1858, at East Greenwich, Rhode Island. In the succeeding year he fitted up a small mill at Watertown, Massachusetts, where it was fully demonstrated that Flax could be fibrilized for use as a substitute for cotton in the manufacture of Calicoes and Sheetings, by a mixture of half cotton and half flax. Since then great improvements have been made in the machinery and processes, and several factories have been established for the manufacture of various articles from this material. Besides the company at Lawrence, the American Felting Co. and the Mystic Mills, at Winchester, Mass., make Carpetings, etc. At Natick, Mass., are the "Flax Leather Company," manufacturing Fibrilia Leather, tons of which are now used for stiffening heels of boots and shoes, inside soles, etc., and the "Berkley Company," which is manufacturing Carpet Linings extensively. At Lockport are companies engaged in manufacturing Flax-Cotton Twine, etc., and in Canada, and at Pittsburg, Pa., there are mills for preparing the fibre.

are made by Battles & Crombie, Loom Harnesses and Reeds by Edward Page & Co. and Spalding & Co., and Card Clothing and Cards, very extensively, by Stedman & Fuller and Warren & Robinson. Leather Board from pulverized leather scraps is made by Willard B. Hayden & Co., Wool Hats by Desmond Brothers, Files by Frederick Butler, and Sash, Doors and Blinds by Williams & Berry.

MANUFACTURES OF LYNN.

The principal industry of Lynn, it is hardly necessary to say, is the manufacture of Ladies' Shoes. The business was commenced here before the Revolutionary War, and though other towns have embarked in it extensively, Lynn still maintains its supremacy as the principal seat of the manufacture. The total value of all the manufacturing pursuits of Lynn was in 1860 $5,736,043, the whole of which, with the exception of about one hundred thousand dollars, is to be credited to the Shoe trade. There were 136 Boot and Shoe manufacturers, who had a capital invested of $1,039,100, employed 5,767 males, 2,862 females, and produced about 6,000,000 pair of Shoes, worth $4,867,375. Besides these, there were 19 Morocco establishments, 6 Last manufactories, 3 manufactories of Shoe Tools, 4 of Boxes, and 1 of Leather-Cutting Machines, making a total of 169 establishments directly or indirectly connected with the Shoe trade. The minor manufactures of Lynn were of Glue, Beer, Iron Railing, Lightning Rods, Tin and Sheet-iron Ware, Cigars, Soap, and Stove Polish.

In Haverhill, a town in the same County, there were 103 manufacturing establishments, that had a capital of $996,000, employed 5,667 males and 1,158 females, and produced a value, mostly in Shoes, of $4,811,550. The towns of Danvers, Woburn, Randolph, Reading and Abington, are also largely engaged in this trade.

The methods of manufacturing pursued in these towns is largely of a domestic character, though of late years it partakes of the essential features of a well-regulated factory system. The warehouses of those who manufacture largely generally contain a Counting room, a Sole Leather room, an Upper Stock room, two Cutting rooms (one for the upper leather and one for the soles), the Bound Shoe room, the Trimming room, and the Sales and Packing room. Sometimes a Last room, and others of less importance, are provided. The first operation is to cut out the various portions of the Boots and Shoes according to sizes and half-sizes, which are put up with all the necessary trimmings in "sets" of 60 pairs for the coarser kinds, and 24 pairs for the finer qualities. These sets are numbered, recorded, and packed in boxes to be sent to the operatives or workmen to whom they are charged. The cutting out of the soles is generally done by machinery. A knife with a curvilinear edge is set in a frame and worked with a treadle, after the manner of a lathe. By a lateral motion in the machine it can be adapted to the cutting of any requisite width of sole, and being once fixed to a given width the process of cutting is very rapid, and material is saved by the leather being cut at right angles to the surface instead of diagonally as by the ordinary knife. The stitching of the upper leather is now generally done by sewing machines, the binding by females, and the other parts by males, who are styled "workmen" or "jours." These operatives do not belong to Lynn exclusively, but many of them reside in other parts of the State, and in Maine, New Hampshire, and Vermont.

For the convenience of the operatives residing in distant localities, the materials in their prepared state are collected from the manufacturers by expressmen or carriers. These deliver them to the workmen for whom they are intended, and on receiving the work made up deliver that to the manufacturer, and then receive the payment due to the former for their labor. The remuneration of these carriers is generally a small per centage on the amount.

MANUFACTURES OF TAUNTON.

TAUNTON, situated on the Taunton River at its junction with Mill River, 35 miles south from Boston, is the seat of a number of very important manufactories. It has been said that Iron Works were established here as early as 1652,[1] and the various manufactures of iron, as Tacks, Screws, Stoves, Locomotives and Machinery, continue to be among the prominent branches of its industry. In 1860 the value of the tacks, brads, and horse-shoe nails made by the Taunton Tack Company, A. Field & Sons, and Lovett Morse, amounted to $370,000. The Bay State Company produced Screws to the amount of $150,000, having a capital invested of $175,000, and employed 220 hands. Stove and other castings to the amount of $340,000 were made by Eddy & Co., the Foundry and Machine Co., Lemuel M. Leonard, Bartlett & Potter, and the Taunton Iron Works Co., employing in all a capital of $190,000, and

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(1) See Vol. 1., page 479.

383 men. The Locomotive Works of Taunton are the largest in New England. The Taunton Locomotive Company, incorporated in 1847, employs 250 hands, and has made about 300 Locomotives, among them some so distinguished for speed and power that they have attracted attention in England. The first Locomotive that ran west of the Mississippi River was built at this establishment.

The buildings of this Company, which were the first with one exception erected in New England expressly for the manufacture of Locomotives, are extensive and well arranged. The Treasurer of the Company is Mr. Harrison Tweed, and the Superintendent is Mr. W. W. Fairbanks, who has been very successful in constructing coal-burning engines with boilers peculiarly arranged so as to withstand the intense and concentrated heat which that fuel produces. The boilers of the steamer "Portland," the first vessel that successfully used anthracite coal as a fuel, were built by him in Providence about 1835. Mason's Locomotive Works will be described subsequently.

Besides its manufactures of Iron, Taunton has several Cotton Mills, that in 1860 produced Printing Cloths, Flannels, etc., to the amount of $632,000, employing 248 males and 438 females. One Woolen Mill employed 70 hands, and produced Cassimeres of the value of $110,000. Enamelled Cloth and Car Linings are made to the amount of over $200,000 by three establishments, the largest being the Taunton Oil Cloth Company, of which J. M. Crossman is Agent. This Company has made important improvements that greatly facilitate the manufacture of this novel article.

Another branch in which the Taunton manufacturers are quite celebrated, is that of Britannia and Electro-Plated Wares. The firm of Reed & Barton are among the most extensive manufacturers of these articles in the country, and their wares in purity of material and richness of design are not surpassed by any. The business was established here about forty years ago, by Isaac Babbitt, the inventor of Babbitt's Metal Boxes for railroad cars, and passed subsequently through the hands of Babbitt & Crossman, West & Leonard, and the Taunton Britannia Manufacturing Company (none of whom found it profitable,) to Henry G. Reed and Charles E. Barton, who were apprentice-boys to some of the other firms.

Each of the different processes in Reed & Barton's works has its special room or department, as the Machine room, the Burnishing room, Plating room, Press room, two general work rooms, two Buffing rooms, Polish room, and others. In their Press room they have a number of presses of immense power, one screw press weighing about seven tons, for stamping designs and figures upon the different articles of their manufacture. Recently they have introduced engine turning in the Chasing department, which has added to the beauty and brilliancy of their wares. This firm employ about 150 hands.

The "Porter Britannia and Plate Company" was more recently established, but having spared no expense to obtain from abroad the most skilful workmen and procuring suitable machinery, they have succeeded in producing wares fully equal to the best imported.

The miscellaneous manufactures of Taunton include Bricks, Carriages, Casks, Leather, Ring-Travellers and Belt Hooks, Sash, Door and Blinds, Stoneware, and Stove Linings. The Phoenix Manufacturing Company has a capital of $40,000 employed in the manufacture of Black Lead Crucibles, and Stove Polish. The total product of all the manufactures of Taunton in 1860 was $1,910,902, nearly one-third of which was in copper, yellow metal and zinc made by the Taunton Copper Manufacturing Company, of which Crocker, Brothers & Co. are Agents.

The most remarkable establishment in Taunton from whatever standpoint we may view it, whether we regard its extent, the variety of its machinery, the excellence of its manufactures, or the celebrity of its founder, is

William Mason's Machine Works.

The founder of this splendid establishment belongs to that class of intelligent and ingenious mechanics who in spite of early disadvantages, and by the force of native genius, leave their impress upon the age in which they live. New England has been especially fruitful in such men, and they in turn have rewarded her by making her the pride and glory of America. We however are not possessed of the facts from which to write a biography of this eminent mechanic; therefore suffice it to say, that after a boyhood spent successively in the blacksmith's shop, the cotton mill and machine shop, we find Mr. Mason in 1829, when about twenty-one years of age, in Canterbury, Conn., constructing and setting-up power looms for the manufacture of diaper linen—believed to have been the first adapted to this kind of work in the world; subsequently, in Killingley, manufacturing a new article of "ring travelers," or ring frames, which still occupy a high place in "throstle" or "frame-spinning"; and, at a later period, in Taunton, Mass., which, after many sad disappointments and crushing reverses, caused by the failure of others, became the theatre of his future triumphs. It was here, when foreman for Crocker & Richmond, machinists, he perfected the great invention of his life, the "Self-Acting Mule," a machine now so well known to all who use cotton machinery that a detailed description of it would be superfluous. Here, in 1842, when his employers had failed, he through friendly assistance became the principal owner and manager of the works. The prosperous times which succeeded the Tariff of 1842, and the confidence of cotton and other manufacturers in his mechanical abilities, at once established a business which in a very few years enabled him to erect, after his own design, the noble buildings known as Mason's Machine Works—the largest, it has been said, ever erected at one time for the manufacture of machinery. The main shop was 315 feet long and three stories high, but addition after addition has been made to accommodate a constantly increasing business, until now the buildings cover an area of six acres. His business comprised the manufacture of cotton and woolen machinery, machinists' tools, blowers, cupola furnaces, gearing and shafting; but the branch in which he was especially successful was the manufacture of Cotton Machinery. In this department he labored indefatigably to devise and introduce those various improvements which have contributed to increase the production, extend the consumption, and diminish the price of cotton fabrics. In Constantinople, Alexandria, and Cairo, it has been for years the practice of hawkers or pedlars of cotton goods to represent those of British manufacture as "Americanas," because from the recognized superiority of American cottons they can obtain higher prices for inferior fabrics by giving them the American name. If unrestrained by hostile legislation, American manufacturers could monopolize the markets of the world in the sale of the lower grades of cotton goods, and for this advantage they are indebted not alone to the comparative cheapness of cotton, but to the superior machinery that has been placed at their command by American mechanics.

In 1852 Mr. Mason made an addition to the works previously erected for the purpose of undertaking the building of Locomotives, and in 1853 he brought out his first Locomotive, which at once attracted attention for its beauty and remarkable symmetry of design. With characteristic fertility of genius he aimed to step aside from the beaten track and originate a new model, combining especially beauty of external appearance with excellence of workmanship, and it has been said of him that he brought nearly all the credit upon New England engines that they are likely to retain, and he is probably the only New England builder who has left his mark on the American Locomotive. In his engines the dome was placed exactly over the joint of the equalizing lever between the drivers; the smoke-box cylinder and smoke-stacks were placed in the same vertical line as the truck pintle, and the sand-box was placed nearly midway between. The chimney, which although comparatively light, has necessarily the appearance of great weight, was thus brought directly over the truck, which supported its load with the symmetry of a pedestal in architecture. Mason discarded all outward incumbrances, such as frames and their accompanying diagonal braces—

resembling a ship's shrouds—thus leaving all the working parts in full view, and a clear range from end to end and under the boiler. The horizontal lines of his running board, hand rail, feed pipe, etc., heighten the symmetry of the design, while the graceful forms and disposition of the details give a finished expression to the whole sufficient to raise it to the dignity of a work of genuine art.

A competent authority has remarked—"An examination of American Locomotives affords abundant proof that beauty of design and accuracy of proportion are almost always accompanied by excellence of workmanship. In mechanism, elegant outlines and an agreeable disposition of details are never the result of chance—while, at the same time, a mere artist would be as incapable as a careless workman to produce them. A truly beautiful Locomotive—for extraneous ornament and skin-deep decoration do not constitute beauty—must be the work of one who thoroughly understands its mechanism; and the machinist who can produce an elegant design, will be constitutionally sensitive in the matter of workmanship, with all its mechanical refinements of fit and finish. No one, we are sure, will deny that even a Locomotive may possess beauty, and we pity any one who, having once seen an engine of the Rogers or Mason style, has failed to discover that quality in its outline, arrangement and detail. The forms of art may be as beautiful as those of nature, although the effect of the former may be due to certain outward analogies which they bear to the latter."

When the Locomotive branch of his business had become established, Mr. Mason made a step forward by equipping a foundry for the manufacture of Car Wheels. In these, as in every thing else that he attempts, he aims at improvement. His wheels are what are called "spoke," or tubular, in contradistinction to "plate" wheels, a shape which it is said experiment has proved to insure the greatest strength, besides securing uniformity with the driving wheels.

When the Government was called upon to defend its existence against the attacks of traitors, and it was found that there were but seventy thousand efficient muskets at the command of the authorities, Mr. Mason, in common with many others, set about providing the necessary facilities for the manufacture of Firearms. He erected an Armory, and equipped it with the best machinery that could be obtained, some of which he further improved by original inventions. He is now manufacturing about six hundred Springfield Rifled Muskets per week.

It will thus be seen that Mr. Mason's business comprises the manufacture of Cotton and Woolen Machinery, Locomotives, Car Wheels, and Firearms—each of which is usually carried on as a distinct business, in separate establishments, and considered sufficient to task the ability of a single individual, while to conduct them all successfully requires the talents and powers of a master mind. This is one of the few really remarkable Manufactories of America, exhibiting in all its details so much system, combined with fertility of invention, that if its founder and proprietor were not living we should feel called upon to speak of it in terms of enthusiasm.

Over 700 men are employed in Mason's Machine Works and Armory, and the annual product exceeds a million of dollars.

MANUFACTURES OF FALL RIVER.

Fall River takes its name from the river that here falls into Narraganset Bay, by a descent of over 130 feet in less than half a mile. The hydraulic power is very extensive and peculiar, and early attracted the attention of enterprising capitalists, who have here erected Print Works and Rolling Mills that rank among the largest in the Union. The town is almost without a parallel in possessing the advantage of an extensive water-power combined with a position immediately upon navigable waters.

In 1860 Fall River had ten Cotton Mills, with an aggregate capital of $2,115,000, which employed 1,045 males and 1,387 females, and produced according to the census returns a value, mostly in printing cloths, of $1,873,112. There were also two Print Works, that employed 690 persons, and turned out Prints worth $2,875,000. The "American Linen Company" had a capital of $400,000, employed 44 males and 47 females, and produced Linens and Cottons of the value of $300,000. This, if a correct return for that year, is far below the capacity of the establishment. In Woolens, the principal manufactory was the "Wamsutta Steam Mill," owned by Jesse Eddy & Sons, who produce Fancy Cassimeres and Satinets largely. In Iron, the principal works are those of the "Fall River Iron Works Co.," which has a capital of a million of dollars, and contains 18 heating furnaces, 5 double and 1 single puddling furnaces, and 106 Nail machines. Its product is about 10,000 tons of Nails and Merchant Iron per year. With this, and all the most important industrial enterprises of Fall River, we find the name of Borden intimately associated.

Besides these, there are in Fall River the Foundries and Machine Shops of Kilburn, Lincoln & Son, Marvel, Davol & Co., Gifford & Houghton, and the Stove Foundry of J. D. Flint & Co., the extensive

Flour Mills of David A. Brayton and Chace & Nason, the Trunk-Caster Manufactory of M. R. Chace & Co., the Fall River Lithographic Company (N. M. Buffington, agent), which also manufactures Lamp Shades; the Card Clothing Manufactory of James Newton, and the Loom and Harness Manufactory of A. E. Bigelow, the Mastic Roofing of H. N. Gunn & Co., the Soap and Candle Works of Wm. Mason 2d and Joshua Remington, and the usual shop manufactures.

The aggregate capital invested in manufacturing enterprises in Fall River in 1860 was about $4,000,000, the number of hands employed was 4,800, and the aggregate product nearly $8,000,000.

MANUFACTURES OF SPRINGFIELD.

Springfield, according to the last Census returns, had 37 Manufacturing Establishments, with a capital of $1,074,000, that employed 1,100 male and 637 female hands, and yielded products valued at $2,065,594. This was exclusive of the Arms manufactured at the Government Armory located here, which is one of the most important arsenals of construction in the United States. Over 2,000 persons are employed, and in one month recently they turned out 25,700 Rifled Muskets, the average for two weeks of the month being a thousand per day—a production, however, it is proper to remark, wholly unprecedented in the history of the Armory.

The census-marshals have as usual overlooked several important establishments, but the list of those returned includes one Cotton Mill that employed 750 hands, and produced cotton goods to the amount of $444,484 ; a Woolen Mill that made 100,000 yards of Doeskins ; a Paper Mill that had a capital of $50,000 and employed 75 hands ; the Confectionery manufactory of Kibbe, Crane & Co., which employed 43 hands and produced a value of $120,000 ; the Manufactory of King, Whipple & Co., who employed 55 hands and produced Gold Chains valued at $125,000 ; two manufactories of Jewelry, whose annual product was $121,500 ; six Foundries and Machine Shops, a manufactory of Firearms that then employed 57 hands, and Cigar manufactories whose annual product was $50,000, a Carriage Factory, three manufactories of Hardware and Cutlery, two large Sash, Door and Blind factories, and several manufactories of Tin and Sheet-iron ware, Harness and Trunks, Water-wheels and Pumps, Steam and Gas Fittings.

The establishment that employed more hands and produced a larger value than any other in Springfield, with the exception of the Indian Orchard Cotton Mills, was the Car Manufactory of the

Wason Manufacturing Company.

The construction of Cars is comparatively a new department of manufactures in the United States, but in consequence of the vast and rapid extension of railroads it has become one of considerable magnitude. It is a singular fact that nearly all the companies that have been organized with a large capital for the prosecution of this business have not been successful, and those whose manufactories are now the largest, commenced with scarcely any capital except their individual enterprise and experience.

About twenty years ago, Thomas W. and Charles Wason commenced, on the banks of the Connecticut River, preparing lumber for Railroad Bridges, and did a small business in repairing and building Gravel and Freight Cars. In 1846 they advanced a step forward by leasing a lot of ground on which they erected a shop for making Freight and Baggage Cars, procuring the wheels and most of their castings from a neighboring foundry. In 1848 the "Springfield Car and Engine Co.," which had been organized in the year preceding with a capital of $100,000, for the building of Cars and Engines, and had erected extensive buildings for the purpose and filled them with machinery, finding that the business could not be economically conducted under their existing organization, determined to dispose of their stock and tools in the Car department, and Messrs. T. W. & C. Wason became the purchasers. In 1851 Mr. Thos. W. Wason became sole proprietor of the works by the purchase of his brother's interest, and in the latter part of the same year purchased a foundry for making Car Wheels and other castings. In 1853 he disposed of one-half his interest in the Car Manufactory to another person, which established the firm of T. W. Wason & Co., who continued business as a firm until 1862, when the "Wason Manufacturing Company" was organized, and incorporated with Thomas W. Wason, President, George C. Fisk, Treasurer, Henry S. Hyde, Clerk, and L. O. Hanson, Superintendent.

This Company is now largely engaged in the manufacture of every variety of Passenger, Emigrant, Baggage, Freight, Hand, and Horse Cars, and recently purchased the extensive property formerly owned by the "Springfield Car and Engine Company," the original cost of which with the buildings and machinery was over $120,000. The buildings, eligibly situated near the passenger depot at Springfield, are most substantially constructed, and cover nearly four acres of ground. They comprise a two-story brick building 270 feet long and 70 feet wide, occupied upon the lower floor by the offices, the engine-room (containing a 90-horse power engine, built by Thurston, Gardner & Co. of Providence, R. I., fitted with the "Corliss" cut-off), the machine shop, 80 by 70 feet, and the passenger and freight car-body and truck building departments; upon the upper floor by the cabinet room, where the seats, sash, doors, blinds, and inside work of passenger and street-cars are made, and by the street car-building department. The blacksmith shop is of brick, 180 feet long and 44 feet wide, and contains 30 fires. There are also a brick planing mill 70 by 44 feet, a brick dry-house, and 3 large wooden paint shops (in the second story of one of which is the upholstery department), having accommodations for painting 10 passenger cars, 16 freight cars, and 6 street cars at one time. The foundry, where all the car wheels and castings used by the Company are made, adjoins the Car Works, and occupies a brick building 112 by 70 feet. This branch of the business is still owned separate and apart from the car works.

The machinery in the Car Works is of the most complete nature, no expense having been spared in the construction. Nothing is left to be done by hand that can by any possibility be accomplished by machinery, and a high degree of excellence in the products is thus necessarily attained.

Cars from this establishment have been sent to Egypt, China, Brazil, Venezuela, and to all parts of the United States and Canadas. A large portion of the rolling stock upon the Pacific slope bears their trademark. Improvements are constantly being made in all classes of Cars, especially passenger and street cars, of which this company have turned out large numbers that for beauty of finish and thorough workmanship cannot be surpassed. The first Sleeping-Car ever built in this country came from these works; and since then addition after addition has been made to their conveniences, until now there seems no room for further improvement.

About 300 men are now employed in these works, who receive monthly from ten to twelve thousand dollars. All the different departments are presided over by competent and experienced foremen, under the general superintendence of L. O. Hanson, a member of the late firm of T. W. Wason & Co. The Company use in their business about 1,000 tons of cast-iron, 450 tons bar-iron, 30,000 pounds of brass and composition castings, 450 tons of coal, and a million feet of lumber annually. The aggregate business, including car repairing, amounts to over $500,000 per year.

The foundry, purchased in 1851 for the manufacture of car wheels, is now owned by Mr. T. W. Wason, S. W. Ladd, and G. W. Lawrence, trading under the name and firm of Wason, Ladd & Co. They manufacture exclusively Car Wheels, both single and double plated, and Railway Castings, furnishing the same not only to the Car Works but to a number of the leading New England railroad companies. Constant employment is afforded to 25 men, and upwards of 2000 tons of the best quality charcoal pig-iron are used annually.

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MANUFACTURES OF CHICKOPEE.

Chickopee, near Springfield, has several important manufactories. There are two establishments that make Agricultural Implements, one of them (Whittemore, Belcher & Co.) largely; one Leather Belting Manufactory, one of Loom-Harness, Reeds and Bobbins, one of Copper Faucets, and one of Military Accoutrements. Firearms are made by the "Massachusetts Arms Co." to an amount exceeding $100,000 per year. There are several extensive Cotton Mills, two of which in 1860 had 83,176 spindles, 2,443 looms, consumed 7,000,000 pounds of cotton, employed 2,450 persons, and produced 20,000,000 yards of cotton goods. But the most celebrated and remarkable establishment in the town is that of the Ames Manufacturing Company, remarkable alike for the vast variety of articles made, the multiplicity of operations carried on, and the excellence of its manufactures. Its founder was Nathan P. Ames, who in 1829 commenced at Chickopee Falls the manufacture of Cutlery with nine workmen. Mr. Ames was born in 1803, and died in 1847, at the early age of 44. Though not an inventor, he possessed a wonderful insight into the practical value of new inventions, and at the time of his death he was regarded as one of the most eminent of American mechanics. Since his decease the business of the Company has been superintended by his brother, James T. Ames, a gentleman thoroughly skilled in mechanism, and possessing administrative abilities of a high order.

The manufactures of the Ames Company may be divided into four classes—Machinery, Swords and Ordnance, Gilt and Plated Wares, and Bronze Castings. The list of machines made here is very comprehensive, and includes heavy Tools, massive Castings, horizontal Turbine Wheels, Lathes, Planing Machines, and Cotton Machinery. The mechanical ability displayed by this Company is appreciated abroad as well as at home. In 1854 the British Government sent out commissioners to America, who employed the Ames Company to build machines for making the Stock or woodwork of muskets, and which now are in use at the Enfield Armory, near Woolwich, England.

The manufacture of Swords was one of the earliest attempted by Mr. Nathan P. Ames, who in 1831 obtained a contract for furnishing them to the United States Government, and since that time nearly all the government Swords have been made at this establishment.

During the present Rebellion they have very greatly increased their facilities, so as to be able to furnish large numbers of Sabres, Swords, and Bronze Guns to the government, besides keeping their other branches, such as the manufacture of Plated wares and Machines, in full operation for the supply of the market.

They were one of the first, if not the first, to introduce the Electro-Plating and Gilding process into this country in 1839.

Probably however this establishment has obtained its greatest celebrity for its artistic manufactures in iron and bronze, and the colossal Statues of DeWitt Clinton in Greenwood Cemetery, Brooklyn—Franklin, in School Street, Boston—and the equestrian Washington in Union Square, New York—are highly creditable specimens of their skill in this department.

This Company have a capital of $250,000 invested, and employ about 500 workmen.

HOLYOKE, on the right bank of the Connecticut River, nine miles above Springfield, was designed by its projectors to be one of the greatest manufacturing towns in the United States. Acting under a charter granted by the State of Massachusetts to the Hadley Falls Company, with an authorized capital of $4,000,000, a number of capitalists purchased about 1200 acres of land, and constructed a dam across the river 1,018 feet in length between the abutments, and 30 feet high at the head-water, obtaining power sufficient to drive at least 1,000,000 spindles. They laid out a town on a plan calculated to secure many advantages to its future inhabitants, and erected two large Cotton Mills, each 268 feet long and 68 feet wide, five stories in height, and a Machine Shop 448 feet long and 60 feet wide, besides a large Furnace and Blacksmiths' Shop, and equipped them with machinery and tools of the best description.

In 1860 the town had a capital invested in manufactures of $2,072,400, employed 726 males, 1,271 females, and produced an aggregate annual value of $2,108,500. The principal manufactories were the Lyman Mills that had 50,000 spindles and 1,200 looms, the Hampden Mills with 10,000 spindles and 310 looms, the Holyoke Paper Company, the Parsons Paper Company, the Wire Manufactories of William E. Rice, two Machine Shops, and two manufactories of Loom-Harness and Reeds.

SHELBURNE FALLS, about fifty miles north of Springfield, on the Deerfield River, a few miles from its junction with the Connecticut, is noteworthy as a manufacturing place principally from the fact that it contains the largest manufactory of Cutlery in the United States, known as

Lamson & Goodnow's Cutlery Works.

Like most of the other remarkably successful manufacturing establishments of the United States, this has grown up from small beginnings, having been founded by Mr. Ebenezer G. Lamson, who commenced the manufacture of Cutlery at this place about the year 1842. Mr. Lamson is the son of Silas Lamson, who was the inventor of the present form of bent Scythe Snaths—the handles of scythes previous to his invention having been made straight; and for nearly sixty years the family, father and sons, have been manufacturers of these useful articles. In 1844 Mr. A. F. Goodnow became associated with Mr. Lamson in the Cutlery manufacture, establishing the firm of Lamson & Goodnow.

At that time American Cutlery had not yet overcome the prejudices with which it, in common with locks and other articles of hardware, was regarded by both dealers and consumers, and about forty men were sufficient to manufacture all that could be sold. By the introduction of machinery, however, not only the facilities of manufacturing were increased, but a uniformly good quality was secured, which elicited from Fleischmann, in his work on the branches of industry in the United States, the remark that the American "manufacturers of Cutlery have far surpassed those of the old world in the manufacture of Tools, and not merely in the excellence of the metal used, but especially in the practical utility of their patterns, and in the remarkable degree of the finish of their work."

In this manufactory, Table Cutlery, Butcher and Pocket Knives, Augers and Bits, are made almost exclusively by machinery, much of it invented and constructed in the establishment. The blade is forged by trip and drop-hammers, which measure off the amount of steel for the particular kind of blade required, and hammer it into shape; and the shoulder or bolster is formed by hammering between dies or swages so constructed as to give the required form and size. The blade is then passed again under the trip-hammer and receives its last hammering, giving it the required thickness and taper, and at the same time condensing the steel so as to impart to it a good cutting quality. After this operation is performed, which is regarded very critical and requiring the best skill, the blade is next passed through a punching press containing a pair of dies the exact shape of the entire blade, a process that secures uniformity to all; and then it is returned to the drop-hammer and at a low heat is struck between a pair of finishing dies, so made as to touch every part of the blade, and by this means is straightened perfectly. The blade having been thus forged is ready to receive the stamp of the Company, which is put on by means of a large press operated by one man somewhat as a hand printing-press. An expert operator will stamp 3,500 blades per day. Now the blade is ready to be hardened and tempered, a very nice operation for which they use a machine of their own invention, and patented by them.

This machine consists of a series of cast-iron tubes, say 2½ inches internal diameter and 8 inches long, which are placed directly over the fire-box in such a manner as to allow the heat to pass all around them. In these tubes the blades are placed by the workman, commencing at one end of the machine. There is room in each tube for two blades—so, as one is taken out another is put in; and after the fire is once allowed to pass around the tubes, the workman continues to put in and take out of each tube in succession, not having to wait for the blades to heat, as they heat uniformly, and in perfect time, to the degree required. When heated and taken from the tubes they are placed in a vat of prepared oil and cooled; and when taken out and cleaned of the oil, they are passed into a sand bath heated by the same fire used for the tubes. In this bath they remain, watched by an experienced hand, until they are heated and reduced to the requisite temper.

After the Blade is tempered it is ready for grinding and polishing, operations that are performed by hand, by skilled workmen, and in substantially the same manner as in Sheffield. The blade is now ready for the Handle, which is made from ivory, pearl, horn-tips, cattle shin-bones, cocoa wood, rosewood, ebony, or buffalo horns.

The Handles are cut into shape by saws, then passed through various machines, giving them the required shapes, and fitting them to receive the Blades. Ordinarily the handles are fastened to the blade by cement or rivets, but in this establishment most of the handles are attached by special processes, that secure them firmly and prevents the possibility of their becoming loose by use or exposure to hot water. These improvements are patented by this Company and used only by them.

This Company make about five hundred different styles of Cutlery, and consume in their manufacture 200 tons of Steel per year, 18,000 pounds of Ivory, 150 tons of Ebony, 300 tons of Rosewood, 300 tons of Cocoa wood, 400 tons of Coal, 100 tons of Grindstones, 10 tons of Emory, 5 tons of Sheet Brass and Brass Wire, and about 300,000 pieces of Shin Bones.

The buildings are constructed so as to form a hollow square, and cover an area of seven acres of ground. The main building, which is of brick, is 208 feet long by 45 feet wide, and two stories high. Adjoining this is their forging shop, 128 feet long by 45 feet wide, in which they run twenty-one trip-hammers, ten drop-hammers, and other heavy machinery. At the opposite end of the main building is the Polishing Shop, 116 feet long by 25 feet wide, containing two rows of polishers. The other buildings comprise one for making Knife Handles and for Finishing; and another, 112 by 25, for hand-forging and Tempering the Blade. Extensive as these buildings are, they are not sufficiently so to accommodate the increasing business, and the Company propose to erect, during the present year (1864), new buildings affording nearly double the capacity of the present workshops.

The manufacturing department is under the superintendence of J. W. Gardner, who has been with the Company the greater part of the time since they engaged in the manufacture of Table Cutlery, and who is the inventor of some of their most popular styles.

For several years the works have been owned by a Company incorporated as the "Lamson & Goodnow Manufacturing Company," with E. G. Lamson, President, A. F. Goodnow, Treasurer, and J. W. Gardner, Agent. They employ nearly five hundred workmen, and produce Cutlery to the amount of $600,000 annually.

In 1858, Mr. E. G. Lamson purchased the Armory at Windsor, Vermont, where the first Rifles were made by machinery to use the Minie ball or its equivalent, and where the greater part of the machinery and tools were made that are now in use in the principal armory in England, at Enfield, near Woolwich. Here he, in association with E. E. Lamson, under the name of E. G. Lamson & Company, is now making Springfield Rifled Muskets largely, having contracted in 1861 to supply the Government with fifty thousand of these weapons, nearly all of which have been delivered and approved. They also manufacture all kinds of Machinery for making Guns and Pistols, having patterns and drawings of every thing necessary to fit out a complete Armory. They are now engaged in manufacturing a new Breech-Loading Rifle, constructed on the repeating principle, which has been fired nine times in eleven seconds, as a Repeater; and without using the repeating principle, it has been fired twenty times per minute. This is the most rapid shooting of which we are advised. This Rifle has been tested by order of the Ordnance Department, and has been recommended as a most efficient weapon for soldiers' use. It belongs to the class called "magazine guns," the magazine being in the stock under the barrel. Experts who have examined almost all of the different kinds of breech-loading guns have expressed a preference for this, and even predict that it will inaugurate as important an era in the history of firearms as did the invention of Colt's Revolver. The repeating principle of this gun will be applied to Pistols.

Ever since the invention of firearms the attention of ingenious men has been directed to the discovery of a perfect weapon loading at the breech. If our countrymen have succeeded in making a perfect weapon of this kind they will be entitled to the credit of having made an invention second only in importance to the invention of gunpowder. With such a weapon, an army lying on the ground and almost protected from harm, could pour into its antagonist a "sheet of flame and shower of lead" that none could withstand. With such a weapon and the metallic water-proof cartridge an army could make its most successful attacks in the heaviest rain-storms. With such a weapon and cartridge the present army of the United States, without calling for, much less impressing or conscripting one additional man, would be invincible by any foe armed with the ordinary musket or rifle, and standing exposed while "drawing ramrod" and going through the ceremonial required in loading at the muzzle after each single shot. Distinguished generals have expressed the opinion that the adoption of a weapon of proper construction, loaded at the breech, would double the effective force of an army, but in this instance common sense is quite equal to the most mature military experience.[1] It is believed that the officers of the government are now taking all of this class of arms that can be manufactured, but if it can be proved that they are not, the next generation will not judge them with the leniency of the present.

Messrs. E. G. Lamson & Co. are now employing about 400 men in their Armory and Machine Shop.

(1) Major-General Rosecrans, in a letter dated November 13th, 1863, stated—"The Government has already become convinced that breech-loading, revolving chambered, or single-charged arms, should be used for cavalry and other mounted troops. It should, and in my opinion will, ultimately adopt them for infantry. I have no doubt that could such arms, of proper construction, be substituted at once for those now in use, it would add not less than fifty per cent. to the force or power of the troops now in the field. In other words, we should *augment our army one-half* by changing the weapons."

MANUFACTURES OF WORCESTER.

[The following are the Statistics of the principal manufactures of Worcester County, which includes, besides the City of Worcester, the manufacturing towns of Clinton and Fitchburg, for the year ending June 1, 1860:]

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Agricultural implements	3	$15,000	$25,800	45		$67,000
Fanning mills	1	800	368	1		1,2[illegible]
Plows	2	152,500	179,350	251		367,15[illegible]
Plow handles	1	9,000	4,000	7		12,900
Rakes	2	6,000	1,535	11		9,585
Straw cutters	1	26,000	24,000	30		50,000
Baskets	6	1,275	525	9		4,450
Bolts, nuts, etc.	1	3,000	7,000	7		10,000
Boots and shoes	183	478,325	4,076,531	4,212	5,040	9,595,307
Boxes	26	155,100	103,280	108		174,062
Brass founding	2	4,450	11,300	6		17,900
Brooms and brushes	6	11,780	6,865	20	4	20,900
Broom and tool handles	5	12,000	2,415	17		12,200
Buttons	1	4,800	1,200	2	7	7,200
Cabinet furniture	15	39,000	29,627	80		90,200
Chairs	62	646,400	479,901	1,311	1,231	1,421,545
Calliopes	1	8,000	1,630	5		8,000
Cane splitting	1	108,800	90,000	70	45	150,000
Car linings	1	1,500	1,967	6		3,160
Carpets	1	300,000	397,000	95	129	600,000
Carriages	35	113,700	67,286	184		180,553
Cars	2	45,000	27,542	38		77,800
Carpenters' tools	2	49,000	5,900	15	1	34,000
Casks and barrels	1	4,000	3,275	11		12,350
Clothing	37	140,650	263,708	139	326	478,250
Coffins	4	3,900	8,178	10		10,550
Combs	25	131,500	114,665	262	51	371,200
Copying presses	1	5,000	3,000	9		15,000
Cotton goods	2	4,137,514	2,380,608	2,970	3,345	6,506,069
Batting and wadding	2	0,500	7,470	4	1	9,600
Cordage	2	34,000	32,757	28	20	66,980
Yarn, thread, wick, etc.	6	90,500	115,460	71	80	161,545
Cotton and woolen machinery	7	232,000	261,650	663	6	730,940
Eave troughs	1	2,000	2,000	10		12,000
Edge tools	6	329,300	211,639	336		478,358
Envelopes	1	33,000	40,750	12	45	65,000
Firearms	2	52,500	21,900	132		166,000
Flour	67	231,200	652,671	95		732,457
Gun powder	1	30,000	42,938	9		71,450
Hand cards	8	34,400	28,220	52	9	161,700
Hardware	6	33,500	54,910	62		112,000
Hose and belting	2	18,000	48,000	10		66,000
Hosiery	3	79,000	51,650	53	69	131,800
Hubs, spokes and felloes	10	23,960	9,975	31		39,852
Iron founding	8	119,400	139,720	174		274,000

Manufactures.	No. of Establishments.	Capital invested.	Raw material.	Male hands.	Female hands.	Value of Product.
Iron, rolled	1	$115,000	$367,000	212		$440,000
Jewelry	5	82,000	27,900	39	7	90,500
Lasts and boot trees	11	12,950	8,576	43		40,180
Leather	47	387,100	977,520	317		1,309,913
Linen goods	1	75,000	115,750	50	100	150,000
Locomotive and car repairing	1	10,000	3,000	20		13,000
Looms	1	20,000	21,000	60		75,000
Lumber, planed	9	29,800	66,985	41		95,620
" sawed	168	345,350	428,802	352	1	625,724
Machinery	26	236,000	149,535	406		472,893
Machine-card clothing	8	140,900	265,435	70	10	331,200
Machine knives	3	43,500	21,449	27		48,000
Malleable castings	1	9,000	12,300	40		38,500
Maps	1	3,000	3,330	3		6,000
Matches	2	1,400	5,345	4	7	8,705
Melodeon cases	4	16,000	13,275	39		52,400
Musical instruments	2	7,500	1,940	12		11,200
Musical reeds	1	6,000	3,610	15		18,500
Morocco	2	5,200	62,000	11	1	36,000
Needles	2	4,000	600	11		6,250
Organs	1	4,000	2,930	6	1	9,000
Packed provisions	1	7,000	11,000	1		13,000
Palmleaf hats	21	67,700	268,463	110	445	438,187
Paper, printing and writing	6	177,000	290,426	114	75	515,850
Paper, wrapping	3	51,000	42,000	25	10	124,000
Patent machines	3	26,300	51,400	14	11	74,200
Patterns and models	2	2,000	1,200	11		10,280
Pianos	2	18,000	11,800	29		46,000
Piano and melodeon legs	2	28,000	30,700	45		53,000
Pocket Books	5	30,700	118,960	36	136	157,500
Pottery ware	2	6,000	3,150	13		10,000
Preserves	2	4,200	4,851	3	3	150,000
Printing	4	25,000	6,350	22	2	21,600
Refined cider	4	13,200	6,827	12		14,856
Reeds and harness, etc.	7	27,100	21,240	44	36	48,450
Saddlery and harness	17	16,950	16,400	43		42,990
Sash, doors and blinds	11	34,300	58,000	102		120,798
Scythes	6	77,000	39,720	99		114.200
Shoddy	5	11,300	42,081	26	4	73,620
Shoe nails	1	4,000	15,000	7		19,750
Shoe pegs	3	6,500	3,405	14	2	11,000
Shoemakers' tools	6	26,600	4,992	51		43,500
Skates	1	5,000	1,485	8		11,000
Soap and candles	10	30,750	45,377	27		68,235
Steel traps	1	2,500	1,020	6		4,500
Stoves	3	11,500	12,855	17		25,900
Straw goods	4	64,500	209,687	96	182	457,750
Tin and sheet-iron ware	28	82,200	83,613	101	1	148,455
Wire	5	275,000	506,700	394	28	940,000
Wooden ware	26	157,800	162,800	332	3	832,053
Woolen goods	42	1,910,000	3,067,531	2,005	1,106	5,195,542
Woolen yarns	3	42,000	66,150	46	33	112,000
Total, including miscellaneous manufactures not above specified	1,357	$13,334,769	$18,234,584	18,190	12,699	$37,092,920

REMARKABLE MANUFACTORIES IN WORCESTER.

The Washburn Wire Works—Ichabod Washburn & Moen, Proprietors.

WORCESTER has long been known as one of the most flourishing and enterprising of the interior cities of New England, and noted especially for the variety and extent of its manufactures. The leading interest in the city, judged by the amount of the product (which is now considerably more than the statistics show), is Wire Drawing; and the oldest and largest of the establishments in this manufacture is the "Washburn Wire Works."

These works were founded in 1834, by Ichabod Washburn, who had previously been engaged in making wire at Northville, Worcester County, where he built a small factory as early as 1831. At that time Wire Drawing as an American manufacture was in its infancy—in fact Card Wire was not made from the rods to any extent in this country. What little had been made was of an inferior quality, that tended to excite a prejudice against American wire. This prejudice Mr. Washburn resolved to overcome, which could only be done by making an article of better quality than the imported; and that he did this, is evident from the fact that in five years after he had built the Grove Mill card wire was no longer imported. In this he was aided first by the protection afforded by a favorable tariff, and secondly by a large home demand. The County of Worcester has long been the principal seat of the manufacture of Cards, both hand and machine, in this country. Here the Earles, for three generations, and other celebrated makers of cards and card-clothing, have pursued this important branch of business. Indeed, until recently but few cards were made out of Massachusetts. But, more than to either of these circumstances, his success was due to the fact of employing novel and original machinery, that not only improved the quality of the wire, but increased the product. In 1851, at the London International Exhibition, it was freely admitted by the large wire manufacturers of England that the Americans had machinery superior to theirs, and that they were able to make four times as much wire with the same number of hands as was ordinarily done in that country.

Card Wire continued to be for many years the leading article of manufacture at the Washburn Works, but as other kinds became in demand facilities were provided for producing them. When the invention of the Telegraph had induced an extensive demand for wire for telegraphic purposes, Mr. Washburn directed his attention to its manufacture, especially to Galvanized Wire, which is a better conductor of the electric fluid than ordinary wire. Previous to the adoption of the process of galvanizing, the scale had to be removed from the wire by means that required an exposure to acids from fifteen to twenty minutes, which rendered it brittle. To obviate this defect Mr. Washburn secured the control of an English patent for a process by which the wire is passed through a tube heated so as to bring it up to a slight red heat, and then through a cold acid bath, remaining in it however hardly a second, from which it emerges in a perfectly clean condition, and not injured as it usually is when long exposed to acids. Wire made in this way has borne the weight of trees falling upon it without breaking. The importance of great tenacity in telegraphic wire is too evident to need remark. The following Table represents the common numbers of iron wire used for this purpose, and its strength as plain wire, and also when coated with zinc—the figures representing in pounds the strain at which each had broken:

	Plain iron.	Galvanized.
No. 6	2,300	2,390
No. 7	2,010	2,210
No. 8	1,820	1,985
No. 9	1,520	1,665
No. 10	1,270	1,385
No. 11	1,043	1,155
No. 12	832	992
No. 13	631	886

Messrs. Washburn and Moen are the only makers of Patent Galvanized Wire in the United States, and notwithstanding it is established that the system which they have adopted uniformly secures the additional strength of 12½ per cent. in tension, and the same in the section power, over any other mode of galvanizing yet adopted, they sell it at same prices charged by others for the ordinary wire.

When the popularity of Hoop Skirts created a demand for Crinoline Wire, this firm engaged extensively in its manufacture, and they are now by far the largest producers of this wire in the United States. The steel used in making crinoline wire is imported from England in the form of coiled rods of about ¼ of an inch in thickness.

The first operation to which it is subjected, is heating it to about a bright-red heat, in a furnace adapted for the purpose, by which it is softened. It is next cleansed with an acid to remove all oxide from its surface, after which it is coated with rye-flour and dried in a special apparatus. It is now ready for drawing, which consists in reducing the steel rod to a much less diameter and at the same time greatly extending its length. One end of the rod is first pointed on an anvil down to the size or number to which it is to be drawn on the "gauge plate."

The wire, after it has been pointed, is passed through a hole of the proper size in a steel draw-plate, which is secured fast to the drawing-frame, and is then carried forward and fastened to a drawing-block placed upon the top of a revolving vertical spindle on the drawing-frame. As the block revolves it winds the steel rod around it and pulls it through the hole in the steel draw-plate, reducing its size to wire gauge called No. 7. It takes no less than ten-horse power to draw the steel rod down to wire during this first operation, which compresses the atoms of the metal very close together, rendering it hard and brittle. Before it can be drawn a second time it requires to be softened again in the annealing furnace, and afterwards cleansed in the same manner as it was prepared for the first drawing operation. It is then drawn through a smaller hole in a draw-plate and reduced two sizes, and so on until it has been reduced to the requisite size and what was a few yards in length has been extended to two thousand yards. It is then flattened by drawing from one reel and passing it between a pair of pressure steel rollers. After this the flattened wire is next hardened by passing it through a bath of red-hot lead, then through a trough of oil where it is quenched, then through a bath of slightly-melted lead heated to such a heat as will reduce it to the right temper—requiring much practical experience to secure the proper temper. This process for tempering is patented by this firm. Messrs. Washburn & Moen have facilities for making thirty tons of Crinoline Wire per week. They furnish wires for others to cover, and have also over 900 machines employed in covering wire.

This process may be described as follows: The wire, after being tempered, is taken to the Covering Room on reels, which are placed in a frame near the floor and the wire passed up through the middle of the braiding machines and wound upon a top-reel. In passing upward, a spool carriage, similar in almost every respect to a cord-braiding machine, and carrying several spools of cotton yarn, covers the wire with cords. The spools are moved back and forth in grooves by a series of small sun-and-planet wheels underneath the roll-plate, and while they are thus moved they braid the yarn around the wire and thus perfect it ready to be sent to the warehouse. Not less than 250,000 yards of flattened steel wire are covered daily in this manufactory, and when running day and night double that quantity.

This firm are also the principal and we believe the sole makers in this country of Wire for Musical Instruments. Previous to 1850 all the pianoforte wire was imported, and the business was monopolized by a single house in England. At the solicitation of the late Mr. Chickering, of Boston, Messrs. Washburn & Moen were induced to engage in the manufacture of Wire for Piano Strings, and have succeeded in producing a quality of wire that is superceding the English. The great value of this class of wire consists in its power of tension, which depends largely upon the practical skill of the manufacturer and the processes employed in tempering. Mr. Washburn invented a mode of tempering wire longitudinally, for which he obtained a patent, and the wire made at these works is distinguished not only for great strength but uniformity of temper, smoothness of surface, and high finish. It is used in all the best pianos made in this country. This firm also make fine Plated Wire, which is wound around the bass strings of other musical instruments. Besides these leading descriptions of wire, the firm make all the varieties of Steel Wire for Needles and for Machinery and Springs, and also wire from refined iron for Gun Screws—in fact all kinds of round, flat or oval, iron and steel Wire.

Since 1850 Mr. Philip L. Moen has been associated with Mr. Washburn in the proprietorship of these works, and has had charge of the financial department of the affairs of the establishment. Mr. Moen is regarded by the community in which he lives as one of their best financiers. The firm have two mills in Worcester, the Grove Mill in the northern part of the city, which has a roof 1500 feet in length, and a smaller mill in the southern part of the city, where the coarse kinds of wire are made. They employ about 600 hands, including 40 females, and produce an annual value exceeding a million of dollars.

The increase in the demand for Wire within the last twenty-five years has been enormous. When Mr. Washburn commenced, in 1831, his production was limited to about 300 pounds per day: now his works alone produce about 7 tons of Iron and 5 tons of Steel Wire per day—and the product of the whole country, it is estimated, is about 90 tons a day. In Great Britain there has been a similar increase. About sixty years ago nearly or quite the whole product of iron wire in England was made at Prestwood, and taken to Birmingham with a two-horse team twice a week. It did not probably exceed four tons per week. Now one firm in Manchester manufactures 165 tons per week, and this is probably not more than one-tenth of what is made weekly in Great Britain.

The Washburn Iron Works—Nathan Washburn, Proprietor,

Are another of the noteworthy establishments that have given the city of Worcester a reputation for enterprise in manufactures. These works are among the largest of their kind in New England, and their founder has had an experience in the manufacture of Iron extending over a quarter of a century. He is also the inventor of a Car Wheel which is extensively used not only on railroads in New England, but in Canada and our Western States.

Previous to establishing himself in Worcester, Mr. Washburn had been engaged in the manufacture of Iron at Fitchburg, Mass.; of iron castings for machinery at Stafford, Conn., his native place; and of castings for cotton and woolen machinery at Rochester, New York, where in 1847 he obtained his first patent for an improved Car Wheel. But not being as successful at Rochester as he desired, he disposed of his business there in the fall of 1848 and went to Worcester, entering into partnership in the Car Wheel manufacture with E. A. Converse, under the firm-style of Converse & Washburn, which continued until 1854, when Mr. Washburn became the sole proprietor. In 1849 he invented another improvement in Car Wheels, which was patented in 1850, and now widely known as Washburn's Patent Wheel. He claimed as his invention the combination of the arch with the curved plate and arms connecting the hub and rim, and an improvement in the manner of disposing of the metal in the wheel so as to produce great strength and relieve it from strain, when cast and properly chilled, thus avoiding most of the defects to which ordinary wheels are liable when cast whole. The success of this wheel was such that it not only greatly increased the business of the foundry at Worcester, but led to the establishment of foundries for casting the wheels at Troy and Schenectady, New York, and other places. At the Car Wheel Works at Brandon, Vermont (which are in part owned by this inventor), Washburn's form of wheel are now being made. It was formerly the practice to cool wheels at the foundry in Worcester by immersing them while hot from the moulds in a pit of white sand; but now we believe the wheels are cooled in ovens expressly designed for the purpose.

In 1857 Mr. Washburn made important additions to his works, which now consist of two Rolling Mills 400 by 125 feet, a Foundry 150 by 60 feet, a Wire Mill 150 by 40 feet with a wing 60 by 40, and other buildings, covering in all about four acres of ground. One of the rolling mills is devoted to roiling Locomotive Tires, for which he has a machine that he has patented, which rolls the tire to its proper shape, and of any size, without boring. Until recently imported iron was used in this manufacture, but he is now rolling tires from the produce of the ore-beds at Salisbury, in Litchfield County, Connecticut, which supplied the metal from which cannon, shot, and shell were made during the Revolutionary war, and the heavy guns with which the "Old Ironsides" was armed. It is believed that this iron is fully equal if not superior to the English for the purpose.

For the last six years Mr. Washburn has been largely engaged in rolling Railroad Iron, and is now producing about 450 tons per week. In converting old rails into new, he adopts processes that are not generally practiced, and which greatly improve the quality. The rails before being rolled are thoroughly hammered under six-ton trip hammers, and then returned to the furnace and reheated. New rails made from old ones by the processes adopted at these works are said to be superior to those ordinarily made from pig-iron.

At the outbreak of the present insurrection, when it was manifest that the Government Armories were unable to supply the demand for improved arms, Mr. Washburn was among the first to engage in the manufacture of Gun Barrels. Prior to the commencement of the present war, barrels were welded under the blow of trip-hammers, upon anvils which contained a die (after the manner of the present "drop") of the form desired, a similar die being placed above within the descending hammer. This process of welding the barrel required numerous heatings and repeated blows, and was both costly and laborious. Mr. Washburn was among the first, it is said the very first, of the private establishments to employ the rolling machine in this manufacture, which has reduced the cost of making a gun barrel from twelve cents to four. The barrel being heated to a white heat in the furnace, is passed through rolls or constantly-decreasing grooves until it has attained the proper dimensions. It weighs ten pounds when it enters the first roll, and when it issues completed it weighs less than seven. The plan is English, and was brought to this country by an individual who enjoyed a monopoly of his art for a long time, but the process is a secret no longer, being now employed we believe in most of the best establishments. About 5,000 Gun Barrels are produced in the Washburn Iron Works every month.

It will be seen that the operations of this extensive establishment comprise the manufacture of Car Wheels, Locomotive Tires, Railroad Iron, and Gun Barrels. About 550 men are employed in these works.

William A. Wheeler's Iron Foundry,

Though not so extensive as the others that have been remarked upon, is for several reasons entitled to rank among the notable manufactories of Worcester. It is one of the oldest establishment of the kind in the State, having been commenced by Mr. Wheeler in 1825, and has been owned by the same proprietor for a period of nearly forty years. The first Steam-Engine employed in the State west of Boston was put up in these Works.

Mr. Wheeler was also the first, it is said, to manufacture Hot-Air Furnaces in Massachusetts, and it is a somewhat remarkable fact that notwithstanding the number of new articles of this class with which Boston and its vicinity have of late years been supplied, his Furnace maintains an undiminished popularity, though but few changes have been made in it to provide an increase of radiating surface since its introduction in 1835.

Wheeler's Iron Works are located centrally in Worcester, on the line of the Nashua and Worcester Railroad, and comprise an Iron Foundry, a Brass Foundry, a Machine Shop, Forge, and Stove Shop, and their buildings, that cover in all about two acres of ground. The machine shop is furnished with every convenience for expeditious work. The manufactures of the establishment comprise almost every description of Machine, Railroad, Iron, Brass and Composition Castings, Stoves, and Hot-Air Furnaces for wood or coal, Tilt and Drop Hammers, Water, Gas and Steam Pipe, Hydrants, Retorts, Boring Mills and Punching Presses, Building Iron Work, Cauldrons, Kettles, etc. The Pattern Shop is provided with a large stock of patterns, accumulated in the course of years, and the assortment for shafting, gearing, and general mill work, is especially noticeable.

Mr. Wheeler is one of the most highly respected and ingenious, as well as one of the oldest of the American iron founders now engaged in active business. Among the latest of his inventions are improved Drop and Trip-Hammers, which are now extensively used for the manufacture of Firearms and jobbing, and a number of them are now in use in the government armories.

Besides Wheeler's Iron and Brass Foundry, there are in Worcester the foundries of Earle & Jones, the Arcade Malleable Iron Company (W. McFarland, Agent), the Brass and Copper Foundry of Jason Chapin, the Stove Foundry of Otis Warren, and others. There is also a number of firms engaged in the manufacture of Mechanics' Tools, among which we would mention Wood, Light & Co., Shepard, Lathe

& Co., Lucius W. Pond, Thayer, Houghton & Co., and Armsby & Harrington. There are two firms engaged extensively in manufacturing Wood Working Machinery, namely, Ball & Williams and Richardson, Merriam & Co., who make Woodworth's, Daniels', and Gray & Wood's Planing Machines. The manufactures of miscellaneous machinery are quite numerous, comprising the firms of Goddard, Seaverns & Co., and Rice, Barton & Co., who make machinery for Paper Mills, L. & A. G. Coes, manufacturers of Coes' Patent Wrenches, Curtis & Marble, manufacturers of Shearing Machines, Buck Brothers, manufacturers of Chisels, Gouges, etc., J. Toulmin, who makes Vibrating Shears, S. C. & S. Winslow, who make all kinds of Gearing and are extensive manufacturers of Skates, E. H. Bellows, Steam-Engine builder, F. P. Oliver, manufacturer of Galvanized Iron Cornices, and T. F. Taft, whose leading business is the manufacture of heavy Shears and Punches.

Oliver Ames & Sons' Agricultural Implement Manufactory,

Is the largest establishment of the kind in New England, and, some say, in the world. This firm are the successors of Nourse, Mason & Co., who succeeded Ruggles, Nourse & Mason, who commenced the business in Worcester in 1836. To Draper Ruggles, Joel Nourse, and John C. Mason, the farmers of America are under many obligations for their unwearied assiduity in supplying them with superior Plows, at low prices. They found the cast-iron plow a rude and imperfect implement —they left it so nearly perfect in point of efficiency and convenience as hardly to be susceptible of further improvements. When they engaged in the manufacture about a hundred cast-iron Plows supplied the annual demand. Twenty years afterward, they made and sold in a single year thirty thousand Plows, of one hundred and fifty different forms. Their manufactory, originally in a small shop now or lately used as a stable, then in the basement rooms of "Court Mills," became, by the addition of building to building, to accommodate an increasing business, nearly as remarkable for its extent as for its importance.

In 1860 this establishment passed into the hands of Oliver Ames & Sons, who had been distinguished in another though kindred branch of manufacture, that of Shovels and Spades. Ames' Shovels have for many years been a well-known and leading article in the hardware trade. Nearly sixty years ago Mr. Ames commenced the manufacture at Easton, Massachusetts, in the most unpretending manner, buying the iron and steel for not more than a dozen shovels at a time—manufacturing them, carrying them to market, and with the proceeds procuring more stock. He however lived long enough to see his establishment thus begun, grow to be the largest of the kind in this country, and perhaps in the world, requiring for its weekly supply from twenty to twenty-five tons of Swedish and Russian iron, and from twelve to eighteen tons of cast-steel, employing about 350 hands, and producing about four thousand Shovels and Spades per day, or nearly a million and a quarter per year. The main building of the Finishing Shop at North Easton is 525 feet long, with an L ninety feet in length; and the next largest building is 150 feet by 70 feet wide, with an L, which contains a steam engine of 190-horse power, with a fly-wheel attached 20 feet in diameter that weighs over nine tons.

Besides the Shovel Factory at North Easton, and Forge Shops at West Bridgwater, Canton and Braintree, and the Agricultural Implement Manufactory in Worcester, Messrs. Ames & Sons have a manufactory at Groton Junction, where Patent Hay Cutters and a variety of other farming utensils are made. They are now making nearly a hundred varieties of the cast-iron Ploughs, and over fifty with steel mould-boards, which are peculiarly adapted for the rich sticking soils of the new lands of the Western States. Their Warehouse or Salesroom is in Boston, in the spacious halls above Quincy Market, extending nearly the entire length of the market—where may be seen an assortment of Agricultural Implements, Seeds, etc., such as is rarely witnessed in ordinary agricultural fairs or exhibitions.

Besides this extensive manufactory, Worcester has two establishments where Mowing Machines are made—those of the Buckeye Mowing Machine Company and Alzirus Brown; and one of Mowing Machine Knives, of which Messrs. Towne & Harrington are proprietors.

T. K. Earle & Co.'s Card-Clothing Manufactory,

In Worcester, is the oldest and the largest establishment of the kind in the United States. It was founded by Pliny Earle, the uncle of Messrs. T. K. and Edward Earle, who now comprise the present firm. He was the first manufacturer of Machine Card-Clothing in this country, and his first customer was Samuel Slater, who has been repeatedly mentioned in this History. He left to his nephews and successors many important improvements, which they have used as a basis of still other improvements, that have rendered this manufactory confessedly pre-eminent in this branch of manufacture.

The original machine used for inserting wire in cards was patented in 1810, by Thomas Whittemore; but the real inventor was Elizur Smith, of Walpole, Mass. The Hon. Daniel Webster said of it, that it seemed to be more nearly endowed with human intelligence than any other machine ever invented; and John Randolph, after looking at it, exclaimed, "All but the immortal soul!" This however would now be exaggerated praise, in view of the progress that has been made in the invention of automatic machines. It seizes the wire with its iron finger, bends it, punches holes in the cloth or leather, then inserts the wire, and if the slightest derangement take place, or the least imperfection is manifested in the manufactured product, it stops, and waits until the difficulty is remedied. With the improvements that have been made, only three men are required to tend over fifty machines.

Messrs. Earle & Co. have now a hundred machines in constant operation in their new mill on Grafton Street, near the Western Railroad depot, combining many important improvements, that enable them to produce an article as uniform and perfect as can be desired. They cut up about 23,000 sides of leather in a year, consume 62 tons of wire, from No. 18 to 36, and produce from four to five hundred square feet of Card-Clothing per day, worth, at present prices, about $1.75 a square foot. They keep on hand a stock of Doffer Rings of all widths, with all the fractional variations, to meet the urgent demand which frequently arises from accident. They have also introduced a new kind of Fancy Cards which have given great satisfaction. Their Diamond-Point or Angular Wire has become an indispensable Card for Feeders, Tumblers, and Leader-ins in all fine work, and is much used in coarse heavy work for all cylinders. They furnish Aprons for Combing Silk and Worsted, Fillet for Apperley's Patent Self-Acting Card Feeder, and Cards of Diamond-Pointed Wire, of brass or iron, for Cleveland's Drying Machines.

During the last seven years Messrs. Earle & Co. have been experimenting on Cards for the manufacture of Flax Cotton, the importance of which has already been alluded to. They are now prepared to supply every variety required in this branch of manufacture. They also publish a pamphlet of estimates of the number of feet of Card-Clothing required to cover the various wool and cotton carding machines.

Worcester has a number of fine establishments for the manufacture of Machinery for cotton and woolen mills. Besides Earle's Card-Clothing Manufactory, we would mention especially the Manufactory of E. C. Cleveland & Co., of George Crompton, of Daniel Tainter, Bickford & Lombard, Rice, Barton & Co., and Goddard, Seaverns & Co., who make Calico-Printing as well as Paper Machinery.

A firm in Boston (Messrs. Jordan, Marsh & Co.) recently purchased the premises formerly known as the South Junction Shop, and twelve acres of ground, and established a Woolen Manufactory designated as "The Adriatic Woolen Mills." The main building is 400 feet long and 40 feet wide, two stories high, and is equipped with machinery which was supplied from the shops of the Worcester machinists. The whole is under the management of J. G. Sargent, formerly of Leicester.

Among the other manufacturing establishments of Worcester there are several that deserve honorable mention. The Revolver and Rifle Manufactory of Allen & Wheelock is quite extensive; and besides this, Messrs. Armsby & Harrington make Holden's Patent Rifle; Frank Wesson manufactures Wesson's Rifles and Pistols; and E. A. Prescott makes Pistols. Carriages are built by A. Tolman & Co. and George T. Atchison, and Wheels are manufactured by S. G. Reed. There is also an extensive manufactory of Cars, owned by Osgood Bradley. Belting is made by Graton & Knight and Jones & Goulding, Envelopes by Hartshorn & Trumbull and J. G. Arnold, Enamelled Cloth by Hampson & Holt, Letter Copying Presses by C. Whitcomb & Co., Switch Stands by F. G. Woodward, Machine Brushes by Ellis Thayer, Sewing Machine Hemmers by Davis & Hill, Boudoir Organs by Taylor & Farley, Melodeon and Organ Reeds by A. Davis & Co., Mouldings and Brackets by Russ & Eddy, and Silver Ware by Henry C. Foster.

The manufacture of Boots and Shoes is an important branch of industry in Worcester, being carried on largely by the firms of C. C. Houghton & Co., Rice & Meacham, W. A. S. Smyth & Brother, Jos. Walker & Co., J. S. Stone & Co., E. N. Childs, H. B. Fay, Albert Gould, J. H. Walker, Hiram French, H. B. Jencks, C. Newton, and Thomas Pierce. Messrs. C. D. & W. B. Bigelow have recently established an extensive manufactory of Shoes, known as Bigelow's Steam Shoe Manufactory. The building is 120 feet long by 41 feet wide, and four stories high. One hundred and sixty men and sixty women are employed in this establishment making fine pegged and sewed work. The principal Salesroom of the firm is in the city of New York.

Worcester County includes, besides the City of Worcester, the important manufacturing towns of Clinton, Fitchburg, Webster, Sturbridge, and Uxbridge.

CLINTON is a new town set off from a part of Lancaster, incorporated in 1849, and now contains a population of over 4,000. It owes its success and importance mainly to the very remarkable inventions of Erastus B. Bigelow, of Boston. In 1837 Mr. Bigelow succeeded in inventing a Power Loom for weaving Coach Lace, and subsequently, in association with his brother and Fairbanks, Loring & Co. of Boston, John Wright of Worcester, and Israel Langley of Shirley, established the "Clinton

Company," for the purpose of building and running these looms. This Company, the first organized in Clinton, made about 1,200,000 yards of Coach Lace annually until 1857, when all their stock, looms and patent rights were purchased by William H. Horstmann & Sons, of Philadelphia, who are now the proprietors.

Soon after the Clinton Company began operations Mr. Bigelow invented an improved Loom for weaving Counterpanes, which led to the establishment of the "Lancaster Quilt Company," which now manufactures about 70,000 Counterpanes annually.

Subsequently he modified his Coach Lace Loom[1] so as to adapt it for weaving Brussels and Tapestry Carpets, which led to the establishment of the "Bigelow Carpet Company," organized in 1849, and which is now manufacturing about 150,000 yards of Brussels Carpet annually. Mr. Wallis, an intelligent English gentleman, pronounced this without doubt the most interesting Carpet manufactory in the United States, and especially commended the fabrics for their evenness of surface, fineness and strength of make, and brilliant colors, the water for dyeing being obtained from wells sunk for the purpose.

Previous to the organization of this Company, however, the "Lancaster Mills" for weaving Ginghams were projected and built, and which are generally considered to be the most complete establishment of their kind in the United States. They have 21,000 spindles, 600 looms, and give employment to 800 operatives. The capital of the Company is $900,000, and the connected structures, including a very remarkable Dye House, cover an area of about four acres of ground.

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(1) The Loom for Brussels and Tapestry Carpeting is the Coach Lace Loom full-grown. Nothing short of actual inspection can give any just idea of its wonderful capacities and life-like action. Wires three feet or more in length are here inserted and withdrawn with a precision and quickness which no manual dexterity ever attained. Let us watch the operation. First, mark that intruding knife or wedge, which, as it rises, separates from its companions the wire next to be taken, and guides the pusher, which shoves it along towards the pincers. The pincers now walk up, grasp the wire, and draw it entirely out. While this is doing, another set of nippers, hanging down like two human hands, come forward, descend, and catch the wire at the moment when the drawing pincers drop their prey. No sooner have they seized the wire than they retreat to their original position, beneath which a small angular trough has just arrived. The fingers relax, and the wire drops into the trough, which immediately returns. Last of all, a triangular pusher, rushing through the trough, sends the rod into the open shed. Note also the double action of the withdrawing pincers, which, while they attend to their own special mission, perform also sergeant's duty by constantly bringing into line the straggling wires. Those bird-like three-fingered claws, which dart back and forth with such rapidity, are busy in plaiting the selvedge, and their work is perfect. These too are "contrived a double debt to pay," for whenever their thread breaks they instantly stop the loom.—MEMOIR OF E. B. BIGELOW.

FITCHBURG, in Worcester County, contains several extensive manufactories, especially of Paper and Scythes. The Paper Mills of Crocker, Burbank & Co., Jesse Lyon & Sons, the West Fitchburg Mills, and R. Snow Jr. & Co., are the most important in Worcester County; and the Scythe manufactories of William Kimball, Edwin Richardson, and A. Simonds & Son, are probably the largest in the country. Cotton goods are made largely by George Blackburn & Co. and Levi Sherwin, and Woolen goods by the Fitchburg Woolen Company and C. J. Delehantry & Co. Chairs are also made largely in this town by the Walter Haywood Chair Company and A. Davis & Co.; Chair Canes and Rattan Stock by the American Rattan Company; Sash, Doors and Blinds, by A. A. Beckwith; Mowing and Reaping Knives by Whitman & Miles; Edge Tools by Alfred White; Soap and Candles by John P. Sabin & Co. and Charles Davis; and Harnesses and Carriages by Charles Fessenden and S. G. Frost.

PITTSFIELD is noteworthy as a manufacturing centre principally for its manufactories of Woolen Cloth. Berkshire County was the first in this country to engage in the manufacture of Broadcloth, and her manufacturers continue to maintain a leading position in the production of all kinds of woolens. There are several interesting incidents in the history of the early manufactories, but they have already been alluded to in this volume. (*See Index*, PITTSFIELD.) The following is a List of

WOOLEN MILLS IN BERKSHIRE COUNTY IN 1864.

NAME.	TOWN.	SETS OF CARDS.	PRODUCT.
L. Pomeroy's Sons	Pittsfield	10	Cloths and woolen cassimeres.
Pontoosuc Manufacturing Company	"	8	Balmoral skirts.
Taconic Mills	"	8	Union cassimeres.
Pittsfield Woolen Company	"	6	Fancy cassimeres.
S. N. & C. Russell	"	4	Fancy cassimeres and skirts.
J. V. Barker & Bro	"	10	Fancy cassimeres.
D. & H. Stearns	"	8	Union cassimeres.
Peck & Kilborn	"	1	Flannels and balmoral skirts.
W. J. Hawkins & Co	"	1	Flannels and balmoral skirts.
Barker & Tillotson	"	1	Cassimeres.
Berkshire Woolen Company	Great Barrington	12	Fancy cassimeres.
Lee Woolen Company, Elizur, DeWitt, & Wellington Smith	Lee	9	Fancy cassimeres.
Glendale Woolen Co., J. Z. & C. Goodrich	Glendale	10	Army cloths and Union cass's.
Barker & Co	Hancock	3	Satinets and balmoral skirts.
William Taylor	"	2	Wool yarn.
— Birmingham	Dalton	1	Balmoral skirts.
Plunkett Woolen Company (3 mills)	Hinsdale	12	Broadcloths, Union cass. and satinets.
F. W. Hinsdale & Brother	"	4	Union cloths.
Dean & LaMonte	South Adams	6	Fancy cassimeres.
Blackinton & Phillips	"	6	Fancy cassimeres.
Briggs Brother	North Adams	2	Union cassimeres and meltons.
S. W. Brayton & Co	"	4	Satinets and Union cassimeres.
Tyler & Bliss	"	8	Fancy cassimeres and tweeds.
S. W. Blackinton & Son	"	10	Do. do. 600,000 yds. per ann.
Perry & Penniman	"	2	Union cassimeres.

Besides these there are in the county the following Cotton Mills:— At Pittsfield, J. L. Peck, 2,500 spindles, product 2,500,000 yards Cotton Warp per annum; Learned & Van Sikler, 100 looms, product Sheetings; at Housatonic, the Monument Mills, 3,000 spindles, product 3,000,000 yards Cotton Warp; at South Adams, Wm. Pollock, 4,000 spindles, product 4,000,000 yards Cotton Warp; Wm. C. Plunkett, 1,800 spindles, product 1,800,000 yards Cotton Warp; Adams & Clark, 1,200 spindles, product 1,200,000 yards Cotton Warp; at North Adams, O. Arnold & Co., 9,100 spindles, 250 looms, capacity 2,446,800 yards Print Cloths per annum; H Arnold & Co., Print Works, 3 printing machines, capacity 6,752,000 yards; Richardson, Freeman & Company, 17,000 spindles, 300 looms, capacity 3,780,000 yards Print Cloths; Richardson, Freeman & Company, Print Works, 3 printing machines, capacity 6,752,000 yards; R. R. Andrews, 1,376 spindles, 50 looms, product 600,000 yards Cotton Drills and Sheetings; S. Johnson, 3,072 spindles, product 2,000,000 yards Cotton Warp; at Cheshire, Elisha Jenks has 150 looms producing Sheetings.

SALEM, 14 miles north of Boston, which has always ranked as the second town in New England in point of wealth and commerce, has within a few years developed considerable manufacturing enterprise. The Naumkeag Steam Cotton Company (E. D. Kimball, President), has mills located here that have 65,000 spindles. This Company paid its stockholders a dividend of 71 per cent. in 1862. The Chemical manufactories are also important, and include the Salem Laboratory Company (George Nichols, Treasurer), and the White Lead Works of the Forest River Lead Company (George C. Chase, Agent), established in 1832, and incorporated in 1846. Among the other principal manufactories we may mention the Salem Gaslight Company (Francis Brown, Treasurer), the Glue Manufactory of J. M. Anderson, the Curled Hair Factory of Philip English, the Twine and Cordage factories of Joseph Chisholm and James F. Gwinne, the Patent Enamelled Leather Manufactory of James C. Stimpson, the Varnish Factory of S. Burbank & Son, the Hosiery Manufactory of Jabez Wilson, and the Essence and Extract Factory of Flint & Goldthwaite. Jewelry is made by Smith & Chamberlain and John Mackintire, Inventor's Models by T. B. Russell, Nautical Instruments by Samuel Emery, Pumps and Blocks by Benjamin Felt and A. Donaldson, Soaps by S. W. Robertson, Trunks by Eben Price and B. H. Osgood, Boots and Shoes, Cigars, and Carriages, are made by several firms, and Furniture by Henderson & Thurston, H. & H. G. Hubon, Israel Fellows, and Joseph Wallis. The leading interest however is the manufacture of Leather, there being in Salem over fifty

Tanners and Curriers, who produce annually a value exceeding a million and a half of dollars.

Massachusetts has more than one-half of all the capital invested in manufactures in New England, and with the exception of New York and Pennsylvania, is the largest manufacturing State in the Union. Her production of Cotton Goods is nearly three times greater than that of any other State; and though there are hardly one-third so many Woolen mills in Massachusetts as in Pennsylvania, the aggregate production is one-third more. In 1860 Massachusetts had 7,766 manufacturing establishments, with an aggregate capital of $133,000,000, employing 148,000 male and 68,300 female hands, yielding products valued at $266,000,000. She produced three-fourths of all the Boots and Shoes made in New England, three-fourths of the Furniture, two-thirds of the Leather and Agricultural Implements, more than one-half of the Clothing, and about one-half of the Steam-Engines, Machinery and Iron Castings. None of the New England States are large producers of Spirituous or Malt Liquors, but Massachusetts contained in 1860 eleven of the nineteen Distilleries, and thirteen of the thirty-one Breweries.

MANUFACTURES OF PROVIDENCE, R. I.

[The following are the Statistics for Providence County, which includes, besides the City of Providence, a part of Pawtucket and other manufacturing towns, for the year ending June 1, 1860, as prepared for this work at the Census Office, and never before published.]

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Agricultural implements	3	$13,300	$6,380	10	......	$15,845
Batting	2	20,000	92,000	40	......	140,000
Bleaching and dyeing	9	437,300	110,060	390	30	494,300
Bobbins and spools	8	19,300	11,298	33	15	26,577
Bolts, nuts, washers, etc	4	182,000	120,250	122	......	186,300
Boots and shoes	53	92,945	146,295	341	16	277,259
Boxes	5	20,900	18,904	24	......	37,610
Brass founding	8	30,600	41,675	29	......	68,377
Bread	7	54,100	182,805	89	4	258,511
Bricks	6	83,000	12,950	160	......	62,000
Cabinet furniture	16	125,900	88,063	125	1	181,472
Calico printing	3	513,000	424,060	965	30	1,826,400
Carriages	24	93,900	72,675	192	7	232,740
Chemicals	5	110,000	123,980	67	......	157,100
Cigars	7	45,300	37,438	89	62	204,536
Clothing	47	257,600	567,731	370	904	1,071,586
Coffee and spices	2	20,000	58,860	13	1	84,500
Combs	1	30,000	8,600	29	......	35,000
Confectionery	8	17,700	47,030	30	15	100,395
Copper smithing	1	4,000	16,000	17	......	40,000
Cotton goods	59	5,662,200	3,010,644	3,591	4,142	6,516,105
Cotton yarn, batting & cordage	27	579,400	509,073	405	661	985,265
Cotton-seed oil	1	150,000	90,000	40	......	118,000
Distilled liquors	1	15,000	48,000	3	......	62,000
Doors, sash and blinds	13	61,500	75,175	129	......	219,686
Dye woods	2	13,000	42,178	8	......	69,800
Files	2	57,000	36,834	58	......	80,000
Fire engines	1	6,000	20,000	35	......	36,000
Flour and meal	13	112,500	489,581	35	......	560,522
Gas	4	792,600	62,213	64	......	197,735
Hair cloth	6	39,500	35,325	18	86	60,500
Hats and caps	6	15,000	27,890	23	18	52,250
Hinges, cast-iron	2	120,000	42,405	190	......	200,000
Horse shoes	2	6,000	3,265	14	......	13,500
Hose and belting	6	114,000	145,132	75	......	230,000
India rubber goods	2	156,000	105,111	69	44	246,700
Iron founding	7	168,000	90,584	221	......	218,225
Jewelry	77	1,112,900	916,297	1498	263	2,251,282
Leather	5	18,000	56,187	20	......	77,367
Lime	3	62,000	24,000	22	......	45,000
Looking glass & picture frames	4	6,100	10,340	10	......	22,500
Lumber	12	24,600	26,375	32	......	42,576
" planed	6	102,800	158,700	71	......	246,500
Machinery	15	539,900	252,235	657	......	797,975
Machinery, cotton	11	529,500	152,318	719	......	659,194

Manufactures.	No. of Establishments.	Capital invested.	Raw material.	Male hands.	Female hands.	Value of product.
Malt liquors	2	15,800	13,213	14	......	21,967
Marble work	8	94,400	43,626	108	......	102,900
Mathematical instruments	1	10,000	17,000	20	......	40,000
Nails	3	344,200	199,600	223	......	327,000
Packed provisions	4	13,500	114,125	12	......	125,677
Patent medicines	1	50,000	35,000	7	9	75,000
Printing and publishing	3	23,000	24,027	48	......	95,612
Reeds and loom-harness	5	30,600	30,537	40	118	80,600
Sad irons	1	30,000	33,200	120	......	100,000
Saddlery and harness	12	22,900	16,293	37	......	40,955
Sails	2	6,500	17,000	17	......	32,000
Screws, wood	2	1,004,000	397,000	315	300	1,092,600
Scythes	1	100,000	55,000	100	......	100,000
Sewing machines	1	35,000	6,745	60	......	102,000
Shirts and furnishing goods	2	8,000	24,860	2	64	53,800
Silver-plated & Britannia ware	6	18,800	86,390	17	......	101,750
Silver ware	3	392,000	317,131	235	......	490,000
Soap and candles	4	45,500	79,793	19	......	104,460
Spiral springs	2	23,300	51,489	20	......	65,000
Steam and gas pipes	4	45,000	81,800	79	......	139,000
Stoves	4	205,000	91,950	270	......	259,000
Tin and sheet-iron ware	28	84,400	92,577	128	......	217,242
Wireworking	1	4,000	5,000	12	......	15,000
Wheelwrighting	16	24,300	11,223	35	......	37,975
Woolen goods	26	2,087,000	2,246,604	1742	883	3,995,545
" yarn	1	500	7,800	2	4	10,000
Wrought-iron pipe	1	15,000	25,800	24	......	80,000
Total, including miscellaneous manufactures not above specified	893	$17,936,985	$13,654,956	15,875	9,582	$39,206,478
Aggregate in Rhode Island	1191	24,278,295	19,858,515	20,795	11,695	40,711,298
Do. do. in 1850	864	12,935,676	13,186,703	12,923	8,044	22,117,688
Increase	327	$11,342,619	$6,671,812	7,872	3,651	$18,593,610

Increase 84 per cent.

REMARKS

On the Manufactures of Providence.

Providence is one of the wealthiest and most enterprising of American cities in proportion to its population, and the greater part of its capital and enterprise is now invested in manufactures. It has been estimated that if all its wealth could be equally divided amongst the inhabitants, each man, woman and child, would be entitled to nearly seventeen hundred dollars. Besides the numerous manufactories located within the city limits and the vicinity, there are many important establishments in other parts of Rhode Island, and other States, that are owned by citizens of Providence. A few years since, Dr. Snow, of Providence, investigated the subject, and ascertained that 77 Cotton

Mills, 4 Print Works, 3 Woolen Mills, and 2 Bleacheries, located outside of the city limits, were owned in Providence. The firm of A. & W. Sprague run 153,000 spindles, 3,600 looms, and produce in ordinary times 33,280,000 yards of Cotton Cloth per annum, besides printing about 24,000 pieces per week; but none of their mills, we believe, are within the boundaries of the city of Providence.

THE BLEACHERIES.—Providence is noted for its extensive and excellent establishments for Bleaching and Coloring. The oldest and the largest of these is that of the PROVIDENCE DYEING, BLEACHING AND CALENDERING COMPANY, of which Wm. C. Snow, Esq. has been Agent for many years. It has been so long established, that, we are informed, nothing is known of its original capacity, or the exact time of its commencement, except that at the beginning its capacity was quite limited. Both Dyeing and Bleaching have been carried on from its commencement. When it was first established, and for some time after, the charge for bleaching was 12½ cents per pound, payable in cotton yarn, at the ticket price, yarn No. 12 at 34 cents per pound. In the year 1819 or '20 the price was reduced to eight cents per pound, payable in cash. At present, in this as in the other bleacheries, the average price for bleaching and finishing is about three-fourths of a cent per pound.

The Company have now two establishments—the main one, located near the centre of the city, and a branch situated in the suburbs of Providence. The main works, which were originally operated by an engine of 20-horse power, are now driven by one of 200-horse power, and the auxiliary branch by one of 60. The Company have now facilities for bleaching six tons of cloth per day, and dyeing and finishing four thousand pieces per week. The improvements that have been introduced have not only increased the quantity, but improved the quality of its production.

The RHODE ISLAND BLEACHERY is another of the old establishments of this kind in Providence. It is said to have been originally erected by Samuel Dexter. From him it passed into the possession of William W. Bishop, Esq., who owned and operated it until recently, when it was purchased by Messrs. Adams & Butterworth, its present proprietors. Coloring as well as Bleaching is done in this establishment, its capacity being about four tons of Bleached Sheetings and Shirtings per day, and two thousand yards of colored goods per week. An engine of 150-horse power is employed to propel the machinery.

The PONTIAC BLEACHERY was established about the year 1822. Its present proprietors are Messrs. Benj. B. & Robert Knight, who have owned and operated it for many years. No business but that of Bleaching is done in the establishment, though the Messrs. Knight are extensive manufacturers, whose factories are mentioned in this volume in another place. The works are driven by both steam and water power, and are capable of turning off four tons of bleached goods per day. All the modern improvements have been introduced into this establishment.

The SILVER SPRING BLEACHERY was established in 1842. Its original capacity was limited to two tons of bleached goods per day. It is now driven by a steam engine of 80-horse power, and turns off five tons of bleached goods per day. It has been owned for a number of years by Messrs. Frieze & Dow, who have adopted all the improvements for finishing that are in use in America or Europe.

Of the CANAL BLEACHING COMPANY in Providence, and WILLIAM F. SAYLE's extensive Bleachery in Pawtucket, we have no particulars.

FILES.—Instead of there being but two manufacturers of Files in Providence, as the Census Returns report, we know of three—GEORGE CHATTERTON, JAMES WOLSTENHOLME, and FRANK FENNER. The first two are natives of Sheffield, England.

Mr. Chatterton, who is said to be the largest manufacturer of hand-made Files in the United States, came to this country in 1839. For many years he supplied some of the most extensive steam-engine builders and other manufacturing concerns in Rhode Island with Files, but since the commencement of the present rebellion, and at the time of our visit, he was chiefly employed in supplying manufacturers of Firearms with the various kinds of Files used by them, and among others the United States Armory at Springfield.

In addition to the manufacture of Files, Mr. Chatterton is engaged in the importation of Steel, having advantageous connections with a steel manufacturer of Sheffield in England. His importations are chiefly of machinery and spring steel.

HAIR CLOTH.—It is said that there are but two concerns in the United States that manufacture Hair Seating by machinery, the principal one being the PROVIDENCE HAIR CLOTH COMPANY. This Company claim to have adopted improved methods of finishing their goods, and to make them in every particular equal if not superior to the best German or other imported cloth. Horse hair, which alone is used, is imported from South America and Europe, and after being assorted into different lengths is colored, and then woven. The fabric as it comes from the loom is very even and beautiful, and seems to deserve the preference awarded to it by those who are competent to judge of its merits. This Company employs about sixty hands, and produces about five hundred yards per day.

HINGES.—The manufacture of Butt Hinges was commenced in Providence in 1842, which was the first to any extent in the United States. The first articles manufactured were loose-joint Butts, of which the greater portion made in the world is now made in this city. Subsequently the manufacture of *fast*-joints was entered into, but so great was the prejudice of hardware dealers against an American article that the manufacturers were compelled to introduce them among carpenters and builders by their own personal exertions.

There are now three Companies engaged in the manufacture of Butt Hinges in Providence—the AMERICAN BUTT COMPANY (H. C. Pabodie, Agent), the NEW ENGLAND BUTT COMPANY (A. Stanhope, Agent), and the UNION BUTT COMPANY (William S. Daboll, Agent). The smallest Butts made are one inch square when open, and weigh three-fourths of a pound per pair. The largest are 7 by 12 inches in size, and weigh eleven pounds per pair.

JEWELRY AND SILVERWARE.—The principal centres of the manufactures of Jewelry in the United States, are Providence, R. I., Attleborough, Mass., and Newark, N. J. The manufacture in each of these places has its own peculiar characteristics, Providence being the chief seat of the manufacture of the finer kinds of cheap jewelry. The first manufacturer of this class of Jewelry was Nehemiah Dodge, who commenced the business as early as 1794, and who claims that the persons who first established themselves in Attleborough purloined the secret from him under pretence of buying for country cousins. The earliest manufacturers in Providence, of whom we have any account, were Nehemiah Dodge, Ezekiel Bun, John C. Jenckes, and Pitman & Dorrance. In 1805 these firms employed about 30 workmen in making Breastpins, Eardrops, Watch Keys, and other articles. The business has fluctuated with the financial condition of the country; but though at times it seemed almost abandoned, it has steadily progressed until it has attained a vast magnitude.

Within the last few years a revolution has been effected in the modes of manufacturing Jewelry by the introduction of machinery propelled by steam power. In illustration of the extent of the business as conducted by individual manufacturers, we may state that one firm, that of Sackett, Davis & Co., occupy a building 4 stories high, 100 feet long and 40 feet wide, which is filled with machinery. This firm expend about $3,000 annually in getting up new dies alone—a fact that shows the infinite variety of styles. When the general trade is prosperous they employ about 175 hands, and manufacture goods to the value of $350,000 per annum.

It often happens in this, as in other trades, that a happy invention elevates firms at once into importance and prosperity. One firm whose manufactory we visited, that of Greene, Mauran & Co., had invented a *Safety Stud*, which had the merits of not bleaching the linen, and also of being less liable to be lost. A large force of hands was employed in making these alone. This firm had also machinery for making graduated wire for manufacturing purposes, which, in consequence of its cheapness, has in a great measure superceded the hand process. Another firm (P. M. Stone & Co.) had attained a remarkable reputation for the manufacture of Locket Cases. They employed some 40 hands on these alone, and made a great variety of styles and sizes.

The manufacture of *Silver Ware* was commenced in Providence shortly after the close of the Revolutionary War. The earliest manufacturers of these wares have been previously alluded to in this volume. The pioneers in the manufacture of Silver Ware *by machinery* were Jabez Gorham and H. L. Webster, who are the seniors of the two principal firms now engaged in the business. Mr. Webster served his apprenticeship in the shop of Lewis Cary, in Boston, and removed to Providence in 1831, in which year he in connection with Mr. Gorham, then a manufacturing jeweller, established the first Silver Ware Manufactory in Providence, under the firm style of Gorham & Webster. The two firms are now Gorham & Co. and H. L. Webster & Co., both doing an extensive business, and manufacturing wares that for beauty and intrinsic excellence are not surpassed by any in the United States.

MACHINE SHOPS AND FOUNDRIES.—It may be said to be a peculiarity of the Foundries and Machine Shops of Providence, that a larger proportion of the whole number is employed in specialties than in most other cities; and this subdivision in the class of work executed, each aiming to achieve distinction in some particular branch, is no doubt one of the causes of the excellence which distinguishes the products of the Providence shops. Several of the Foundries, as for instance those of the Barstow Stove Company, Providence Iron Foundry, and Spicer & Peckham (late Dutee, Arnold & Co.), are occupied principally in producing Stove Castings. The "Franklin Foundry and Machine Co.," of which Edmund Thurber has been Treasurer, and Albert Briggs, Agent, for many years, is employed principally in building Cotton Machinery, Calico-Printing Machines, etc. It was incorporated in 1836, and has achieved a marked distinction in its special department. Some of the largest machine shops are employed principally in making Steam-Engines, as for instance those of the Corliss Steam-Engine Company, Thurston, Gardner & Company, and the Phoenix Iron Foundry, where the Engine invented by Tisdale Carpenter, of which we have previously spoken, is made. The "Builder's Foundry" is now largely occupied in casting Shot, Shell, and large Cannon. About four tons of Shells are cast daily, and 11 and 15-inch Guns as rapidly as they can be manufactured. There are also two extensive manufactories of Firearms—the "Burnside Rifle Company," a large establishment making the Breech-Loading Gun invented by General Burnside, and the Armory of the Providence Tool Company, of which we shall speak subsequently. Our remarks now however will be limited to those shops in which the construction of rare and difficult machines is made a specialty.

Of this class perhaps the most noteworthy is the HOPE IRON FOUNDRY. This Company was incorporated in 1857, and during the last seven years has probably constructed a greater number of new and difficult machines than any of the other establishments within the same period of time. A patentee of a valuable invention, complicated in its nature, naturally resorts to an establishment making rare and difficult machinery its specialty, with the confident expectation that he will find there the resources and ability to aid him in carrying out his ideas and rendering them practically effective.

Among the novel machines manufactured at the Hope Foundry, are Pantograph Machines for engraving Patterns for Calico Printers. Of these they make two different styles, that are used in some of the most extensive print works. Since the commencement of the present rebellion and the consequent demand for gun machinery, they have directed a large share of their attention to fitting up Armories with all the necessary Tools for making United States Muskets and Carbines complete. Their patterns, some of which were designed by them, are pronounced by competent judges to be of the most approved description.

A prominent item in the business of this Company during the last six years, has been the manufacture of the Windlass invented by Joseph P. Manton, the Agent of the Company, and to which we have elsewhere alluded. At this time especially, when there is difficulty in procuring a sufficient force of sailors to man ships, an improvement of this kind, which enables one-half the number of men to do more effective work in less time than is required by the ordinary windlass, and also occupies much less room, must be of inestimable value to navigators—a fact which no one will question who reads the testimonials of naval officers and masters and owners of over two hundred vessels on which they are now in use. Both the Manton and Emerson Patent Windlass are made at this establishment, each of which possesses merits peculiar to itself. The Company have recently arranged one of these Windlasses to work by steam, which is another advanced step in the line of improvement.

They also manufacture Manton & Billings' Patent Anti-Friction Rudder Supporter, and are now largely engaged in the production of Marine and Stationary Engines, having enlarged their works for that purpose. About 200 hands are employed in this foundry.

Another firm (W. Coleman & Sons) are largely engaged in the manufacture of vessel equipments, especially Patent Strapped and Common Blocks. They also furnish Patent Mast-Head Cranes, Mast Saddles, Steering Wheels, Hand Pumps, Winches, and every description of Lignumvitæ work.

JOHN & THOMAS HOPE's Manufactory is another one in Providence employed principally in the construction of new and difficult machines, more especially tools and machinery required by Engravers. Mr. John Hope, of this firm, is accredited with having invented the first practically successful Pantograph Engraving Machine, an invention which is fairly entitled to rank among the most ingenious of the present century.

The process of engraving Rollers for Calico Printing by means of this machine, is described as follows:—The pattern to be engraved having, by means of a camera, been enlarged nine times, is laid on a table forming a part of the machine, over the lines of which the operator guides a *stylus*, which, by being connected with some ingenious mechanism, brings a number of gravers or diamond-points in contact with the roller, and traces upon its surface the exact copy of the pattern reduced to one-ninth the size of the original, but perfect in all its parts. The gravers do not cut the copper, for the roller is first covered with a coating of varnish, and upon this coating the figures are traced. After this, the roller is immersed in nitric acid, where it remains till the metal has been eaten away to the required depth, the varnish preserving the surface from any action of the acid excepting the precise lines required.

The saving in the cost of engraving to calico and delaine printers by the use of this invention is said to be 75 per cent.

W. T. NICHOLSON is a prominent manufacturer of small Machinery, especially such as Jewellers and Silversmiths use, and latterly of Rifle and Milling Machines for Gunmakers. He is also the inventor of a Metallic Spirit Level, which is now found in many of the best machine shops, whose proprietors recommend it as far superior to the ordinary wooden level for accuracy and durability. The sides and edges being perfectly true, it combines with a Level a convenient and reliable Straight Edge. Mr. Nicholson is also the manufacturer of Clark's Patent Vise, which has all the advantages of the common parallel Cast-Iron Vise, besides the important additional one of holding taper as well as parallel forms, and being simple in its construction. These Vises are self-adjusting, and have a strong rib built up back of the swivel jaw to receive the strain from all directions. Mr. Nicholson has also recently patented a machine for making Files, and a large establishment for their manufacture is about going into operation.

J. R. **Brown & Sharpe** are celebrated manufacturers of Tools for accurate measurements, as, for instance, the American Wire Gauge, machine-divided Steel Standard Rules, and also Watch-Clocks, Yarn-Assorters, and Reels. They also manufacture, or did recently, the Willcox & Gibbs Sewing Machine, for James Willcox, of New York.

William Field has within the last few years given a large share of his attention to the construction of Horse-Powers in connection with the manufacture of Nuts and Washers, etc. Mr. Field, in association with Mr. Rufus Waterman, originated in 1845 the Providence Tool Company, of which he was for many years the agent.

Braiding machines for Covering Crinoline Wire, are made a specialty by R. G. **Gunliff**, who makes every variety of such machines, including those in use for Tape, Candle and Fluid Wicking.

Elwin Shaw gives his attention specially to the manufacture of machinery in use in India Rubber Factories.

Besides those that have been mentioned, we find the following firms and companies engaged in the construction of Machinery of various kinds in Providence : Henry Blundell, Cove Machinery Company (Lewis P. Mead, Treasurer), Elm Street Machine Shop (G. B. Holmes, Agent), William Mason, Mooney & Emerson, Providence Machine Company (T. J. Hill, Agent), Nathan Simmons, G. W. Smith, and Joseph L. Winsor, who has invented a very ingenious machine for Drying Cloths.

Reeds and Harnesses.—The manufacture of Reeds and Harness of Looms is more largely carried on in Providence than in any other city. In the manufacture of Reeds, Wilkinson's Reed Machine is very generally used both in this country and in Europe. It was invented in 1813, by Jeptha A. Wilkinson, in the town of Otsego, New York, but was first successfully put in operation in the manufactory of Sharp, Roberts & Co., Manchester, England. In 1823 the inventor returned to this country and established a manufactory of Reeds in Providence, and in the same year disposed of this establishment and the machine to his brother, Arnold Wilkinson. So perfect was the machine in its original conception that few material improvements, except those made by Arnold Wilkinson, such as setting different lengths of dents, giving different breadths of reeds, have been demanded or attempted since. This establishment, founded by Mr. Wilkinson, passed subsequently into the hands of Gorham & Angell and W. S. Humphrey & Co., and in 1849 to Frederic Miller, by whose enterprise it has become probably the largest in the country, employing in favorable seasons from sixty to eighty hands including females.[1]

The largest manufacturers of Reeds and Harnesses in Providence are FREDERICK MILLER, just mentioned, JAMES A. GOWDEY & SON, who is the oldest established, having commenced business in 1834, and JOHN KENDRICK, who in favorable seasons employs about 50 hands. Mr. Kendrick has made some valuable inventions in this department—among others, one for winding needles by machinery.

Among the manufacturing establishments of Providence there are several that stand out so prominently, and are known so widely, having in fact a national reputation, that they deserve an extended notice among the remarkable manufactories not only of the city but of the United States. Of this class are the Corliss Steam-Engine Works, the Providence Tool Company, and the American Screw Company.

The Corliss Steam-Engine Works.

On March 10, 1849, we find in the Patent Office Reports that a patent was granted to George H. Corliss, of Providence, for an improvement in the Steam-Engine. Such an announcement is usually the epitaph, as well as the introduction of an invention; and as the improvements in steam-engines which have been patented exceed a thousand—one hundred and sixty-nine having been patented in a single year—the fact that any one of them is remembered at all, is in itself evidence that it possesses more than ordinary value. But of all the inventions that have been made during the last twenty years, there are few, if any, which have attracted a larger share of public attention than Mr. Corliss' improvements in the Steam-Engine—none, probably, unless it be the inventions in India Rubber, that have passed through ordeals so costly and trying, or which have more triumphantly vindicated their claims to a high rank in the list of American inventions. We shall state, as briefly

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(1) Mr. Miller is also extensively engaged in rolling steel wire for Crinoline or Hoop Skirt Springs. He has invented and successfully applied in his mills a method of cooling the bearings and inner surface of the roll plates by passing cold water through their centres, thereby chilling without any possibility of cracking, and also by this means increasing the speed of nine-inch rolls from ten to one hundred revolutions per minute, under a heavy strain, without sensibly heating either bearing or surface of the rolls during the entire day—while the old method would heat in a very short time, and require an immense amount of the best sperm oil to keep them in order. This principle of cooling bearings may be applied to many kinds of machinery with great success and economy, and certainly has the merit of a valuable invention.

and succinctly as we can, the object and nature of these important improvements.

The object of Mr. Corliss' improvement was to secure a more equable motion to stationary engines than had been before obtained by rendering the regulator purely automatic and practically perfect, and to save fuel by applying and utilizing the entire expansive force of the steam. Previous to his invention it had been the practice to construct engines in which the steam and exhaust-ports of the cylinder are opened and closed by slide-valves, with valves connected rigidly—that is, where one was moved, the other moved with it to the same extent—and it was found that the force required to move the valve while closed, its office having been performed, was expended fruitlessly, and tended only to increase the wear and tear of the engine. Mr. Corliss proposed to avoid the sacrifice of power by moving each of the steam and exhaust-valves independently by means of one crank-wrist, of a series which are all attached to a common disc, wrist-plate, or other equivalent device, which is secured to and moved with a rock shaft. The several wrists which work the different valves are arranged upon the wrist-plate in such positions with respect to the rods and levers, or other devices which connect them with the valves, that they shall act like so many cranks, each of which vibrates near its dead point, or point of slowest throw, and therefore imparts but little movement to the valve it actuates when the latter is closed: while each moves with its fastest throw, and therefore communicates the greatest movement to its valve when the latter is open.

In addition to this, Mr. Corliss invented a method of regulating the cut-off of steam in its passage to the engine, by combining the governor with the catches, that liberate the steam-valves by means of movable cams or stops, so that when the velocity of the engine is too great these cams will be moved by the regulator to such positions that catches on the valve-rods may the sooner come in contact with them to liberate the valves and admit of their being closed by the force of weight or springs, and thus cut off the steam in proportion to the velocity of the engine—this being done sooner when the velocity of the engine is to be reduced, and later when it is to be increased. In this arrangement throttle-valves are dispensed with altogether, and the governor adjusts the motion by indicating the change required to the levers which move the steam-valves, which are opened or shut by quick or sudden motions, and thus the whole expansive power of the steam is saved and used. In other words, the regulation of the engine is made perfect by the peculiar way of combining the governor with the cut-off, and the cut-off is made perfect by the automatic adjustability secured by that connection.

No one can fail to see that these improvements, if in practice they are found effective, must be of vast utility. A leading authority on the steam-engine, says the apparatus for opening and closing the passages is of more importance to the perfection of the steam-engine than any other part of its mechanism. These improvements may be said in fact to have revolutionized the construction of the steam-engine; and in view of the history of other meritorious inventions, one is not surprised to learn that the inventor and his friends have been compelled to expend nearly $75,000 in establishing the claims and defending the rights guaranteed to him by the patent laws. But after a thorough investigation, or, to use the language of the Commissioner of Patents in granting an extension of these patents, May 9, 1863, after "every means which the highest abilities and great legal sagacity and experience could suggest were used to secure a correct decision," the Court decided that the invention was "new and patentable."

(1) The following is the Opinion of the Commissioner in full:

U. S. Patent Office, March 9, 1863.

In the matter of the application of George H. Corliss for the extension of six Patents re-issued to him on the 12th of July, 1859, for improvement in Steam-Engines.

The original Patent was granted on the 10th of March, 1849; re-issued on the 10th of May, 1851; and re-issued, divided into six patents, on the 12th of July, 1859. The novelty of the invention has thus been three times affirmed by the Office—and four of the six patents have passed the ordeal of a most thorough and able examination in the Circuit Court of the United States for the District of Connecticut, the other two having never been controverted. The court was composed of Judge Nelson of the Circuit, and Judge Shipman of the District. The counsel on both sides were among the most distinguished attornies of the country. Experts were examined—models and drawings were exhibited—and every means which the highest abilities and great legal sagacity and experience could suggest, were used to secure a correct decision. The Court, after a thorough investigation, decided that the invention was "new and patentable."

Incident to the present application for an extension of these patents, the question of novelty has been again submitted to the decision of this office, and the Examiner-in-charge has in an original report made a statement of facts and deductions therefrom strictly accordant with these several prior decisions.

All the inventions alleged by the present remonstrants to interfere with the claims of the petitioner were before the court in the contest already referred to, and were minutely described, and compared with or contrasted to his invention. As nothing has been found in the record which appears to justify any exception to the decision so uniformly reiterated, it is not now necessary to recite descriptions of the several inventions, nor to analyze them for the purpose of showing the essential difference of points alleged to be substantially the same. It is deemed sufficient for me to say, that having examined the invention comprehended in the petitioner's several reissued patents by the light of the entire record, and with the most careful consideration of the objections and arguments of the remonstrants and their learned counsel, I can find no sufficient reason for refusing the prayer of the petitioner because of any lack of patentable novelty in his invention, whether with respect to the precise combination described in the several claims, or to their equivalents.

No question has been raised in relation to the usefulness and importance to the public

In introducing these Engines the inventor and manufacturers adopted the novel plan of offering to take the saving in fuel, in a given time, as their pay, or a stipulated amount in cash, at the option of the purchaser. To the James Steam Mills, at Newburyport, Mass., they offered to furnish two new high-pressure engines with 18-inch diameter of cylinder, 4 feet stroke of piston, and take, in lieu of a stipulated sum, five times the value of the coal saved the first year, the coal being reckoned at six dollars per ton. The amount received by the manufacturers under this arrangement was $19,734 22, the saving in coal during the first year being $3,946 84; and in addition, Wm. C. Balch, Agent and Treasurer of these mills, certifies that there was ten per cent. increased production, so that the actual saving in a cotton mill of 17,024 spindles in one year was $4,341 28. To the Ocean Steam Mills, at Newburyport, Mass., they proposed to take their former engines as they stood, and furnish a new one, for the saving of fuel in two and a half years, or for $3,000 in cash, at the option of the purchasers. The proprietors decided to pay the cash sum, and did wise by so doing, as the saving in fuel amounted to three thousand dollars in about two years. To Messrs. Crocker, Brothers & Co., proprietors of the Copper-Rolling Mill at Taunton, Mass., they proposed to furnish an Engine that would do one-third more work than the one they were using, with a consumption of less than one-half the coal, namely, two tons for five, or forfeit one dollar per pound for every pound per day used above that amount. The proprietors certify, that though they increased the work of the engine about one-third by the addition of machinery, and also increased the production of their mill by the uniformity of motion secured by the improvements in the mode of regulation, yet the average consumption of Pennsylvania coal has not exceeded two gross tons per day; or, in other words, the real difference in the engines, in proportion to the amount of work performed, was 2 tons against 6⅔ tons. To the Atlantic Delaine Mills,

of this invention; nor, in view of the testimony elicited, and of the admissions made, can such question be reasonably entertained, except in its bearing upon the question of the adequacy of the remuneration already realized by the inventor—in relation to which it may be affirmed, that the invention, being confessedly of vast importance, and the ingenuity, time, persistence in labor, capital invested originally, and expense incurred in introducing it to the public and in defending the right guaranteed by the patent laws, all being great, the remuneration already received as shown in the statement of the petitioner, is regarded as falling far short of an equitable reward.

It is therefore Ordered, that the said Letters Patent, numbered respectively 763, 759, 760, 758, 761, 762, and reissued to George H. Corliss, on the 12th of July, 1859, be and the same are hereby extended for the term of seven years from and after the expiration thereof.

D. P. HOLLOWAY,
Commissioner of Patents.

Providence, R. I., whose engines previously required six tons of coal per day, they proposed to furnish new engines that would give the same power at an expenditure of coal not exceeding three tons per day, under a penalty of one dollar per pound for every pound of coal consumed beyond that amount, and pay $25 per day for every day during the first year that the engine should fail to give the requisite motive power The actual amount of coal consumed by the new engine was less than two and a half tons per day. Such contracts as these strike us as curious, and certainly evince in a remarkable manner the confidence of the manufacturers in the value of Mr. Corliss' improvements. At the present time, as their engines are now working in several hundred of the largest manufactories of the country, and their value so well attested, we presume it would be difficult for them to make contracts payable in saving of fuel.

The Works of the Corliss Steam-Engine Company are among the most prominent of the manufacturing establishments of Providence. They are among the first objects that attract the attention of passengers entering the city by the railroads from Boston and Worcester. They were built during the years 1848, '49 and '50, and occupy an area of nine acres. The Machine Shop alone covers about an acre of ground, being 608 feet long, with an average width of 70 feet. The Boiler Shop, Smiths' Shop, Iron and Brass Foundries, are all spacious, and well-equipped with appropriate tools. The Patterns are made and stored in a separate building, which contains large and airy Drafting Rooms in its second story. In their aspect, and especially in the interior arrangement, these buildings present a marked contrast to works of a similar description, being light, cheerful and comfortable, a circumstance that not only imparts pleasure to visitors, but conduces to the health of the workmen employed.

The capacity of this establishment for dispatching work will be inferred when we state that an order for an Engine of 350-horse power, including boilers and all the appurtenances, has been executed in sixty days—and also including a gear fly-wheel of 25 feet diameter, 18-inch face, 5¼-inch pitch, weighing 64,000 pounds, turned, and with cogs on the face cut with the accuracy of clock-work. Finer specimens of workmanship than some of the engines turned out at these works are not produced in this country or in Europe.

Within the last ten years Mr. Corliss has patented a number of very important improvements having relation to the objects of the Company's manufactures. Among those which are probably destined to prove of the greatest practical importance, we would instance his recent invention for obviating the necessity of using salt water in Marine Engines, by the substitution of an Improved Boiler with an apparatus for condensing and using over again the waste steam. The corrosive action of salt water upon iron boilers is so destructive, that those of the best construction rarely last more than three or four years, while iron cylinder boilers, where pure water is used, are found practically to last fifteen or twenty years without becoming destroyed by rust or decomposition.

The external view of Mr. Corliss' new boiler is simply a dome about eleven feet in diameter, with eight furnace doors arranged around the circle of the base. Internally there are seven vertical cylindrical boilers, each of the diameter of 32 inches and height of ten feet, arranged around a larger vertical cylinder boiler, serving as a common centre of union, by means of a connecting-pipe at the bottom and top of each. The eight furnace doors all open into one common furnace, with the grate bars arranged about the vertical boiler, of the diameter of 42 inches, and directly beneath the lower ends of the smaller boilers. These contain numerous tubes like those of locomotive boilers, ascending to the smoke-flue which surmounts the dome above them.

All these congregated boilers being cylindrical, and of small diameters, and constructed of extra-thick flange iron, with no flat sides requiring the support of braces and clamps, are calculated to be worked safely with the pressure ordinarily used in boilers of locomotive engines, say from 90 to 135 pounds to the inch. Thus is available a compound boiler, combining all the desirable elements of extraordinary strength. But to secure its durability, a further very important arrangement is added in an iron tank containing numerous tubes, like those of organ-pipes, with the tops partially closed, and kept cool by a continuous stream of sea water, for the purpose of condensing the waste steam as fast as it escapes from the engine—to be returned again at nearly the boiling temperature to the latter in the form of pure distilled water. It has been found that the boilers, after being filled with pure Croton water in New York, require a fresh supply of only 150 gallons to replenish them after making a trip of the propeller from New York to Providence; and as there is always a surplus supply of several hundred gallons filled into the boilers at starting, several trips or passages may be made without the actual necessity of replenishing the boilers.

To replenish the small waste during long Atlantic voyages, it is only necessary to apply a small distilling apparatus, operated by the steam from the boilers.

Indeed, the longer the voyages, the more important becomes the preservation of the boilers from destruction by the corrosive salt of the sea water. The fact is impressively manifest from the last advices from the two American Steamships of War now in China, which state that both of them have become already unsafe, on their arrival out, from the corrosion or "honey-combed" condition of the boilers, and suggesting modes of getting them home under canvas to obtain new boilers. The efficiency of these ships of war thus actually depends on the preservation of the boilers as the source of their motive power.

The Corliss Steam-Engine Company was incorporated in June, 1856, with a capital stock of $300,000. At present the capital employed is nearly double this amount. Its officers are GEORGE H. CORLISS, President; WM. CORLISS, Treasurer; JOHN H. CLARK, Agent.

The Providence Tool Company's Works

Are another of the establishments of Providence that are entitled to a place among the remarkable manufactories of America. This Company has been a pioneer in certain branches of the Hardware manufacture, and at the outbreak of the present rebellion was one of the first of the private establishments that engaged in the manufacture of Firearms. Its history is briefly as follows:

In 1845, several gentlemen associated themselves together for the purpose of engaging in the manufacture of Carpenters' and other Mechanics' Tools, more especially Plane Irons of all kinds, Chisels, Augers, etc., and erected a stone building 80 by 40 feet, two stories high, with a wing 110 feet by 52, one story high. The location selected was but a few rods from the harbor, affording every desirable advantage for shipping, and also accessible by streets from every side. The capital at first was of small amount, and the number of hands employed did not exceed fifty. In 1847 the Company was incorporated, under the special law of the State, as the Providence Tool Company: and in the following year they made an addition to their works of a stone structure 40 by 40 feet, three stories high, with basement. In 1849 a wooden building was added 132 by 40 feet, including a wing one story high; and in 1853 a brick building 67 by 40 feet, four stories in height, making length of main building 187 feet, and width 40 feet. In the subsequent year there was built and put in operation a furnace of brick designed for casting parts of machinery, and various portions of articles manufactured by them, such as plates for hinges, etc. Thus building was added to building, until the establishment grew to be one of the most prominent in that city of manufactories.

As fast as the buildings were completed they were filled with machinery—and as a facility for transporting materials about the works, an under-ground railroad was provided. Among the important machines which this Company was the first to introduce, were the presses for punching through cold iron. The first press of this description ever made in this country, was one got up in Pennsylvania by Mr. J. O. Arnold, who was subsequently employed by the Providence Tool Company in constructing and operating presses for cold punching. The Company have now in use 23 of these presses, one weighing twenty-five tons, which readily punches from cold iron, nuts four inches square and two inches thick.

During the period that the Company occupied the premises we have mentioned for the manufacture of Tools, they added to their list of articles many not before made to any extent in this country, and which have contributed essentially to the mechanical facilities of the age. They devoted attention especially to the production of those minor but important parts of machinery which facilitate the operations of locomotive, car, and ship-builders—such as Nuts, Washers, Chain-Links, Chains, Stirrups and Levers, Hooks and Thimbles, Sister Hooks. Connecting Shackles, Clinch Rings, Marline Spikes, Plate Hinges, Draw Plates, Bunter Heads, Can Rings, Bolts, etc., and thus provided machinists, ship chandlers, and others, with articles like these, ready to hand cheaper than they could make them, and far more perfect. When, however, the demand for firearms became urgent, in consequence of the present rebellion, the Company converted these premises into an Armory, having erected a new establishment in the north part of the city for their business proper, consisting of a main building 400 feet by 70, one story high, with several smaller buildings in the rear for furnaces, carpenter shop, storehouse, etc. This they equipped with all the requisite tools for the purposes of their manufactures, including those necessary for making United States Cavalry Sabres, Musket Bayonets, and Ramrods. Besides the 23 presses for cold-punching that have been already alluded to, there are 20 Trip-Hammers, for heavy and light forging. They employ in this establishment over 300 hands, besides some 500 in the Armory.

In their Armory they have machinery for making every part of a Gun complete, and are now producing over one hundred first-class Rifle-Muskets per day, and constantly increasing the number. The stocks are turned from the rough plank by machinery, and the barrels are rolled in their own Rolling Mill erected for the purpose. There is probably no manufactory of this description in the country more complete in all its appointments than this now is. The Barrel-Rolling branch of musket-making at this Armory is acknowledged by every one to be as near perfection as it is possible to attain. Every barrel is subjected to the most severe tests, being loaded with quadruple the service charge of powder (64 grains), and a ball of double the regulation weight. Sometimes the charges are octupled, and the balls quadrupled, and not one barrel in a thousand ever bursts. Large orders are being constantly executed for other armories throughout the country. This Company have also a machine for rifling gun-barrels, which accomplishes the rifling of two barrels in one operation, and is also entirely self-acting. The machine for cutting the thread in the end of the barrel for the insertion of the breech-pin, is far superior to the one in use for the same purpose in the Springfield Armory, and the machine for cutting the "sight seats" saves three distinct operations.

Milling machines have been in use for a long time in gun shops, but by means of recent improvements made by the Providence Tool Company they are enabled to give the work great dispatch, the machines being more easily adjusted and regulated, and are more accurately set than those ordinarily used.

This Company make "sear springs," by the aid of the drop-press, at the rate of several hundred per day. In other places they are made by hand—Colt's factory at Hartford being, we believe, the only exception to this statement. In making the mainspring of the lock, this Company saves nearly one-half of the labor ordinarily expended upon the article. The spring is bent by a peculiar apparatus, which, instead of elongating it, as all others do, compresses it to the mold and leaves it in a finished condition; the springs are then filed, tempered, and afterward inspected and inserted in the lock. The hammer is "dropped," as are also the muzzle-bands. The butt-plates which encircle that part of the musket, were once made at the Springfield Armory from malleable iron, owing to the assumed impossibility of making dies that would stand. By an improved plan, which is simply to reverse the mold from its former position, the Providence Company make wrought-iron Butt-Plates at the rate of many hundred per day.

The Armory and Tool Manufactory are under one corporate name and one management, and, though two miles apart, are connected by a private telegraph, operated by a clerk in the office of each establishment. The President of the Company is Richard Borden, the well-known manufacturer of Fall River, Mass., and the resident Agent and Treasurer is John B. Anthony, of Providence, to whose energy and enterprise our country is indebted for an important addition to the number of her first-class manufactories.

The American Screw Company.

The manufacture of Wood or Gimlet-Pointed Screws, is at present a monopoly in the United States. It is carried on by but one Company, whose principal establishments are in Providence, R. I., where Screws were first made by machinery about the year 1834. The Company has its origin in the consolidation of the Companies previously engaged in the manufacture, the two principal ones being the Eagle and New England, and its success is due to the fact that it controls the best machines which have as yet been invented for cutting screws, having purchased nearly fifty patents of inventions designed to facilitate the manufacture, including all the important ones that have been made in England.

The processes of manufacturing Screws, as conducted in these factories, are of marked interest, as the machines employed perform functions that one would suppose could not be executed except by dexterous manipulation. The wire out of which screws are made is all imported in coils, and the first process is to immerse it in acids, after which it is annealed, and then drawn to the proper thickness. The first of the screw-cutting machines employed cuts the wire to the length desired and cuts the head of the blanks. This is done at the rate of about 90 blanks per minute. These blanks are then removed to the second story, which is well filled with machines that perform the second operation by shaping the head of the screw and cutting with a fine saw the groove in the head, and trimming the burr. They are then carried one story higher, where are the threading or finishing machines, which give them the gimlet-point and cut the thread at the rate of about five screws per minute for each machine. Both the shaping and the finishing machines are nearly automatic. The blanks are put into hoppers—the machine extends fingers to receive them, conveys them to the cutting appatatus, holds them there the required time, and then drops the screw into a box prepared for its reception. One woman can attend probably a dozen of these machines. When finished the screws are taken to another room, where they are counted by weighing one gross and allowing the same weight to all others of the same size. About 150 hands are constantly employed in counting, sorting, and papering Screws in these factories.

The American Screw Company has 625 machines, which have the capacity of making 14,000 gross of screws per day, or 4,200,000 gross during the year. It employs on an average 600 hands, 300 male and 300 female, to whom $24,000 is paid monthly as wages. The value of the screws made per year exceeds a million of dollars, the gross product in 1860 being $1,086,600. Over three thousand tons of iron are consumed in the factories, and the trimmings or chips average three tons per day. About five hundred different sizes of Screws are made, both of iron and of brass, the smallest being made from wire number 0 (screw gauge), one-fourth of an inch in length, a gross not weighing more than seven-sixteenth of an ounce; and the largest are made from wire No. 28 (screw gauge), six inches in length, a gross of which will weigh 25¾ pounds. The smallest are made in every particular as the largest, and finished with the same perfection.

The President of the Company is WILLIAM G. ANGELL, of Providence, who is an inventor, and has made many important improvements in the machines employed for manufacturing Screws.

PAWTUCKET, in Providence County, four miles north of the City of Providence, has long been an important manufacturing place. This town, lying on both sides of the river, was formerly partly in Massachusetts and partly in Rhode Island, but in 1861 the boundary was so arranged as to place it wholly in the latter State. It was here that cotton cloth was first successfully made in this country by water-power machinery, as has been stated in the first volume of this History. An interesting incident connected with this enterprise, however, was not there alluded to; but as the principal actor was one of the first machinists in this country who turned his attention to the manufacture of cotton-machinery, and as his son is now proprietor of the most important machine works in the place, it deserves a recital.

When Brown, Almy & Slater came to Pawtucket in 1790, they employed Mr. Sylvanus Brown to construct their machinery under the superintendence of Mr. Slater. He worked in his own shop, under bonds not to furnish patterns to other parties, and with closed doors and great secrecy he constructed cards, drawing, roving and spinning frames. When completed, as was supposed, Mr. Slater found to his dismay that the card would not work. Every effort to start it proved a failure. Mr. Slater was in despair. Fearing that his associates would deem him an impostor who had been wasting their capital upon a visionary enterprise, he communicated to Mr. Brown his intention of running away to avoid their censure. Having asserted again and again that he had seen it in successful operation in England, Mr. Brown persuaded him to remain, declaring, with unconquerable resolution, "This machine shall go!" While perplexed with this difficulty, which threatened to baffle their whole enterprise, Mr. Brown went home to dinner one day, and while sitting by the fire he casually took up a pair of hand-cards with which his wife had been carding cotton. Carefully examining them, his attention was attracted by the peculiar bend or crook in the teeth. Fired with a new suggestion, he hastened to his shop, proceeded to make in his card a bend or crook similar to that which he had observed in the hand-card, and started up the machine—which immediately performed its work with satisfactory results. Thus it was that the great obstacle was removed—not by the suggestion of a marvellous dream in the mind of Mr. Slater, as has been currently reported, nor by mere chance.

In 1792 Mr. Brown invented and used the first Slide-Lathes for turning spindles; also the first machines for fluting rolls. These machines were constructed of hard wood. They were of great utility, and enabled one man to accomplish the work of six.

His son, Mr. James S. Brown, now proprietor of the most extensive Machine Works in Pawtucket, is even more distinguished than the father as a machinist and an inventor. In 1817, while yet a boy, he went to work on cotton machinery in the shop of David Wilkinson, in Pawtucket, and in 1819 he went into the employ of Messrs. Pitcher & Gay, in Pawtucket, on the Massachusetts side of the river. He remained with them until 1824, when Mr. Gay retired from the firm, and Mr. Brown was taken into the business as a partner by Mr. Pitcher. This firm, under the name of Pitcher & Brown, did a successful business in the manufacture of cotton machinery till September, 1842, when Mr. Pitcher retired from the business, leaving it entirely in the hands of Mr. Brown. The *Slide Rest* used on Turning Lathes, by which the height of the tool can be adjusted while the lathe is in motion, was invented by Mr. Brown, while in the employ of Pitcher & Gay, in 1820.

Among other useful tools, now familiar to machinists, Mr. Brown in the year 1830 invented his Gear Cutter for cutting Bevel Gears. The advantage of this machine is that it requires no change of the head-stock to make the proper taper in going once round the wheel.

After the introduction of the celebrated Sharpe & Roberts' Patent Self-Acting Mule into this country, Mr. Brown immediately turned his attention to their manufacture, and in building these machines has acquired a reputation second to no machinist in the United States.

These Mules were first introduced into the United States by Major Bradford Durfee, of Fall River, Mass., in the years 1839–40. Major Durfee was then agent of the Annawam Cotton Mill at Fall River, and visited Europe on business connected with his company. While in England he purchased of Sharpe & Roberts six of their Mule Head Stocks. They were shipped to some port in France, whence they were reshipped to this country and forwarded to Mr. Durfee at Fall River. From Fall River they were sent to Messrs. Pitcher & Brown at Pawtucket, and a part are now running in the Annawam Mill, and the remainder in the Fall River Cotton Mill. The first Sharp & Roberts' Self-Operating Mules made in this country were built by Pitcher & Brown for Messrs. S. & H. B. Chace, of Valley Falls, R. I., where they are now in successful operation. Mr. Brown applied himself with great diligence to perfecting and simplifying the work on this mule invention, making many new and ingenious tools for the purpose. Among other improvements made by him on this mule, was putting a *Catch Box* in the middle of the carriage under the head, in place of a set of changing gears—which improvement is believed by many to be the life of the mule in this country.

The castings used by him in his works were procured from the foundry of General Shepard Leach, in Easton, Mass., up to 1847. In that year he purchased the land on which his present establishment is located, and erected a foundry building 40 by 80 feet, and made his first castings therein on the last day of that year. This furnace has supplied him since with all the castings he has required in his business. The extensive and well-arranged shop in which his business is now carried on was erected by him in 1849. Having decided to build, he was met at the outset with the difficulty of not finding in the market such bricks as he required. With characteristic energy and self-reliance he purchased a tract of land in Pawtucket River, called Bucklin's Island, containing a fine bed of clay, and manufactured his own bricks. His shop is built entirely of brick from his own brick-yard. It is 400 feet in length by 60 in breadth, 2½ stories high, with a large wing attached in which is stationed the steam-engine that supplies the power for the whole shop. In addition to this shop and furnace is a substantial Pattern House, 40 by 72 feet, 2½ stories above the basement, built in 1859, and several other smaller buildings, for various uses,—all so conveniently arranged and admirably adapted to their several purposes as to make this one of the largest and most complete establishments of the kind in the country. The Tools in this establishment were nearly all of them built by Mr. Brown, and for several of them he has obtained letters-patent. His Tool-Holder Turning Lathes, the Fluting Engine improved by him, and many other of his tools, are well known to machinists, and unequaled for the several purposes for which they are used.

The Sharpe & Roberts' Mule, and the Long Flyer Speeder, are the only cotton-manufacturing machines which Mr. Brown has built for several years. When the English Fly-Frame was being generally introduced, he was urged by many manufacturers to build that machine for them; but he steadily refused to do so, with a firmness that seemed to them almost like obstinacy, insisting upon it that they were not what manufacturers of cotton wanted, and that the American long-flyer Roving Machine could be rendered far superior to the English Fly-Frame. He turned his attention to the improvement of the American Speeder. After careful study and many experiments, he succeeded in accomplishing the desired result, and took out a patent for his improvements in January, 1857. The result has fully verified the correctness of his opinion. Almost from the time that he took out his patent for his improvements, the demands of manufacturers compelled him to abandon the building of mules, and to turn the whole force of his shop to the construction of his Patent Speeder; and nearly the entire force of another large machine shop in the vicinity has been employed in making the same machine, without being able to supply the demand.

Among the many inventions of Mr. Brown, for which he has secured letters-patent, is his improved Turning Lathe, for turning bodies longitudinally of irregular surfaces, and in a great variety of forms. This machine, which was designed for turning cotton-machinery rolls, has acquired a new reputation since the outbreak of the war, and the extraordinary demand for muskets, which has converted so many machine shops into armories. Since the commencement of the war, the building of Tools for the manufacture of guns has occupied much of the attention of Mr. Brown, and has to a great extent superseded all other kinds of work in his shop.

On the 1st of January, A. D. 1864, his son, James Brown, and his son-in-law, Charles A. Warland, who have for several years been connected with the business, were taken into partnership, and the business is now carried on under the firm-name of James S. Brown & Sons.

A number of enterprising capitalists of Baltimore, having secured the right for the United States to make and use Bernot's celebrated machine for Cutting Files, and having obtained an act of incorporation from the State of Maryland, were making preparations to commence the manufacture of Machine-Cut Files in that city. In the year 1862 Mr. Brown was employed to build some machines for them. Appreciating the extraordinary merit of M. Bernot's invention, and believing that its introduction would mark a new era in the history of File manufacture in this country, he entered upon the work with great interest, and built nine of these machines, with such modifications and improvements as suggested themselves to him in the process of manufacture. A building was erected near his shop, in which the machines were set up, and have been since in successful operation.

The gentlemen who started the enterprise, becoming convinced that the business could be more successfully prosecuted in New England than in Baltimore, the Maryland company was merged in a new company formed in Pawtucket, embracing some of the most successful and prudent machinists and capitalists, and incorporated in Rhode Island under the name of the "American File Company," with a capital of $500,000. This corporation, with Mr. Brown at their head as President, are now erecting in Pawtucket spacious buildings, and making extensive preparations for carrying on upon a large scale the business of manufacturing Files cut by machinery The President of this Company is the inventor of a machine for Grinding File Blanks, and a Furnace for Hardening Files, which are among the most important improvements that have been made in the manufacture of Files.

Another of the old and distinguished families whose names are associated with the first essays in establishing manufacturing enterprises in Rhode Island, is represented by the firm of FALES, JENKS & SONS, whose works are at Centre Falls, in Providence County. We refer to the Jenkses, who have been more than once referred to in this History.

The founder of this firm, Mr. David G. Fales, having served an apprenticeship in the shop of David, George, and Alvin Jenks, trading as David Jenks & Co., formed a copartnership in 1830 with Alvin Jenks, and commenced the manufacture of Cotton Machinery under the name of Fales & Jenks, at Centre Falls, in a shop belonging to Ruel, Richards & Co. The first new machinery constructed by them, was a Spooler made for Cunningham & Anderson, of Richmond, Virginia. This machine was sold for $60. During the first two years of their existence as a firm their business was limited to the manufacture of cotton-spinning and thread-making machinery; but in 1833 they purchased the right to manufacture in Rhode Island, and sell in New England, Hubbard's Patent Rotary Pump, which has ever since continued to be a prominent article of their manufacture. This simple and ingenious machine consists of two wheels, inclosed in a cylinder, one driving the other by close-fitting gearing. These wheels, revolving in opposite directions, expel the air, which escapes from the enclosing case at the outside of the wheels, thus creating a vacuum, which, the water rushing in to fill, is in its turn expelled, with great force, in the same manner that the air was. They have made important improvements in their construction from time to time, greatly increasing their working power and durability, and now they are the most effective security against fire that has yet been devised. To supply the demand for them has become a business of great magnitude, in which Messrs. Fales & Jenks, by the excellence of their work, improved tools, and other facilities, have acquired an almost exclusive monopoly.

The manufacture of these Pumps, however, has been but a part of their business. From the first they have continued to build various kinds of cotton-machinery. The first Ring Spinning Frames were made by them in 1845; the first Ring Twisters, being among the first of these machines built in this country, for thread, worsted, woolen and silk, were made by them in 1846 for Mr. Benjamin Green. Since that time their whole attention has been given to building Spinning and Twisting Machines and the Rotary Pump.

In April, 1854, Alvin F. Jenks and John R. Fales, sons of the original partners, were taken into the business, and the firm-name of Fales, Jenks & Sons was adopted.

In January, 1856, Mr. Alvin Jenks, whose rare mechanical skill, sound judgment, and sterling integrity of character, had contributed so much to the reputation of the firm, died, and another of his sons, Stephen A. Jenks, was admitted into the partnership—the business being continued under the same name.

Previous to 1860 they had procured most of their castings to be made at other establishments, but in 1859–60 they built their present furnace, a brick building 60 by 100 feet in dimensions, with an L attached 50 by 63 feet, connecting the furnace with the spacious machine shop since erected. During the same years they built a boiler-house 25 by 50 feet, a three-story building 40 by 73 feet for a spindle shop, and also a lumber house 40 by 80 feet.

In 1861 they built a large lot of Milling Machines, used in the manufacture of guns and sewing machines.

In the years 1862–3 they erected a new building for their main shop. This building is of brick, 300 feet in length by 63 feet in width, and three stories in height, with an attic. Connected with this is an L of the same height, 73½ by 60 feet. The flooring of this building covers an area of considerably more than two acres. The whole structure is of the most substantial character, and admirably adapted to the purposes for which it was designed. Their establishment is now among the largest and best-arranged of its class in the country.

The Print Works of THE DUNNELL MANUFACTURING COMPANY at Pawtucket are said to have been the first establishment of the kind in the United States; and in their arrangement as respects economy of labor and the best known modes of Calico Printing, are not surpassed in this country or Europe. The Print Shop is very lofty and well arranged, and contains ten machines, all of which are usually at work. In steam prints as many as ten colors or tints have been produced in one pattern, though the average is about four, and the result very satisfactory.

An ingenious contrivance for untwisting the cloth as it comes from the dye-house is in successful operation at this establishment, by which one boy does the ordinary work of six men. This untwisting machine receives the cloth, through a wooden funnel similar in shape to the hopper of a mill, into a trough of the width of the fabric, forming an inclined plane. The boy attending to the machine assists the opening of the cloth, which is chiefly effected by an undulatory motion, applied as it descends from the funnel. This partial spreading out is rendered more complete by the passage of the fabric over the curved edge of a piece of wood, across which it is drawn on the ascent up the inclined plane or trough, which conducts it to a series of wooden rollers with spiral edges of brass fixed in their surface. These open the cloth completely, in a similar manner to the iron spreading roller attached to every calico-printing machine.

The steam is also economized to a very considerable extent. It is first worked at high pressure, then taken off at 10 lbs. to the square foot for bleaching purposes, and then again at 1 lb. to the square foot for heating the decoctions of dye-stuffs. By this means little or no steam is lost, and the saving is said to be about 33 per cent. in fuel over the English method. No steam is visible in the bleach-house, whilst in bleach-houses generally the upper part is full—and of course this is all waste.

An intelligent Englishman has remarked that the goods printed by Messrs. Dunnell bear comparison with most of the same class printed in Europe. The steams are clear and bright in color; the madders, especially the lawn fabrics, clean and well finished; the prints being generally pure and of excellent tint.

Pawtucket and Central Falls are the principal seats of the manufacture of Thread and Spool Cottons in this country. The celebrated Mills of **Greene & Daniels** are located in Pawtucket, on the east side of the Blackstone River, and consist of a main mill four stories high, with an L one hundred feet in length, a cotton-house disconnected from the other buildings, and a large office-building, part of which is used for putting up goods. All the buildings are of brick, and new, having been commenced in the summer of 1860. In addition to these, the firm lease a mill on the west side of the river. They contemplate a considerable extension of their works within an early period.

The machinery of the mills is of the first class, and especially adapted to the working of both the common staple and Sea-Island cotton. The Dressing Machinery invented by Mr. Daniels is patented, and is said to be superior to any thing of the kind. The production amounts to upward of 20,000 dozen spools of two hundred yard Thread weekly, both white and in colors, and is known as "Greene & Daniels' Ivory Finish"

Spool Cotton. They also manufacture a considerable quantity of Skein Thread and Embroidery Cotton, and much of the thread is furnished on large spools for manufacturing purposes, and is extensively used as a substitute for silk.

This firm also have a Bleachery and Dye House connected with their works, and do a considerable business in bleaching for others, as well as that necessary in their own manufactures. They have on their own premises an extensive reservoir of pure spring water, affording an ample supply for steam, bleaching, coloring, and other purposes. About 225 hands are employed in these works.

One of the oldest-established Thread manufacturers in Pawtucket is **Nathaniel G. B. Dexter**, who for more than thirty years has been connected with the business. His specialty is the manufacture of Knitting, Darning, and Tidy Cottons. When he commenced, the value of the entire production did not exceed $20,000 a year; now the value of the knitting and darning cottons manufactured in his establishment amounts to $400,000 annually. Mr. Dexter has two mills, one situated in the town of Pawtucket, the other in Valley Falls. The buildings are of brick, the one measuring 84 by 44 feet, five stories in height, and the other 64 by 40 feet, and three stories high. Both establishments are run by steam power. There are in these mills 5,000 spindles, and they employ about 150 hands.

Littlefield Brothers have also an extensive manufactory in Pawtucket, and make every variety of Skein Sewing Cottons.

The Works of R. J. **Stafford**, late Stafford & Wood, manufacturers of the celebrated "Stafford & Brothers' Enamelled Thread," are situated in the village of Central Falls, directly upon the west bank of the Blackstone River, and present a fine and imposing appearance. They consist of a brick mill 45 by 28 feet, five stories high, a stone mill of same length and width, four stories high, a two-story building 80 by 40 feet, with a wing 45 by 30 feet, and a long wooden building 125 feet by 25 feet. The brick mill was built in 1824; the erection of the stone mill dates back to a period considerably more remote.

In these mills Mr. Stafford runs 10,000 spindles, employs 250 hands, and produces weekly five thousand dozen of spools, both white and in colors. This Thread for evenness and strength is not surpassed by any made in this country.

MANUFACTURES OF HARTFORD.

The following are the Statistics of Hartford County, including Hartford City, New Britain, etc., for the year ending June 1st, 1860, prepared for this Work at the Census Office.

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Agricultural implements	11	$45,300	$19,700	75	1	$61,314
Axes and edge tools	3	306,000	212,465	370		468,000
Bells	1	4,300	2,768	5		7,000
Bolts, nuts, and washers	6	134,000	111,410	225	10	250,590
Book-binding and blank books	2	14,500	8,305	19	26	51,000
Boots and shoes	10	37,500	130,932	358	40	373,675
Boxes, paper	3	3,900	5,989	10	34	20,309
Brass founding	1	25,000	8,500	16		25,000
Brick and drain-tile	10	21,500	7,482	87		35,810
Brushes	1	6,000	6,000	10	3	22,000
Buttons	2	8,200	4,605	29	19	34,500
Cabinet furniture	5	69,250	35,885	72	2	111,000
Carpets	1	600,000	455,000	320	275	606,000
Carriages	21	89,850	77,830	214	3	305,050
" children's	2	3,500	4,600	9	1	8,000
Carriage hardware	3	19,000	12,360	57		34,400
Carriage trimmings	3	40,000	24,087	62	16	78,009
Cartridges	2	9,000	6,160	3	12	13,400
Cigars and tobacco	23	243,300	202,350	295	85	473,550
Cigar boxes	4	13,000	13,200	10		22,000
Clocks	10	86,500	106,625	239	13	299,000
Clothing	7	110,600	228,000	208	595	439,000
Coffee and spices (ground)	3	43,000	83,680	9	3	103,800
Copper smithing	1	2,000	5,036	4		9,000
Cordage	1	10,000	5,975	5		11,875
Cotton goods	13	333,000	213,091	316	284	484,079
Fertilizers	1	6,000	1,150	4		2,500
Firearms	2	1,750,000	91,999	650	19	1,050,000
Flour and meal	18	157,700	524,965	48		662,972
Gas	2	230,000	33,828	21		94,954
Gold leaf	1	10,000	60,000	19	3	80,000
Gunpowder	3	779,500	473,300	166		991,500
Hardware	20	750,900	642,292	1055	74	1,368,284
Hooks and eyes	2	62,000	32,390	12	46	85,000
Hoop skirts	2	83,000	108,900	65	275	212,000
Hosiery	9	787,000	343,633	303	409	907,850
Hames	1	12,000	6,000	35		35,000
Iron founding	2	20,000	12,250	42	4	39,250
Iron railing	1	4,000	5,572	8		11,245
Jewelry	3	78,000	69,242	49		104,000
Leather	7	53,200	62,930	25		92,950
Leather belting and hose	3	141,000	223,900	57		355,000
Liquors, malt	4	46,000	39,845	13		70,410
" distilled	7	65,700	63,750	30		107,800
Lithography	2	9,500	5,160	17	6	17,500
Looking glass & picture frames	1	5,000	15,000	10		25,600

Manufactures.	No. of Establishments.	Capital.	Raw material.	Male hands.	Female hands.	Value of product.
Lumber, planed	2	40,000	79,000	26	......	95,000
" sawed	14	43,700	41,710	35	......	87,095
Machinery, steam-engines, etc.	7	265,200	135,006	307	......	368,485
Marble work	5	55,500	28,000	112	......	94.000
Molodeons	1	5,000	2,610	7	......	10,000
Paper	21	1,134,500	898,855	361	302	1,316,320
Pottery ware	3	10,800	1,700	12	......	14,700
Printing and publishing	11	156,600	184,848	249	97	422,488
Rules, bevels, and planes	3	76,000	23,603	123	4	96,400
Saddlery and harness	7	68,650	256,062	246	112	397,750
Saddlery hardware	3	80,000	60,100	115	35	140,000
Safety fuse	3	40,000	47,245	14	18	70,940
Sash, doors and blinds	4	42,800	38,765	50	......	69,600
Saws	2	21,000	10,470	12	......	26,500
Shirts, collars, etc	5	61,000	72,675	13	258	136,900
Silk, sewing	2	620,000	338,683	104	512	571,000
Silver-plated & britannia ware	4	285,000	200,230	235	63	618,000
Soap and candles	3	66,800	87,318	29	5	159,325
Spokes, hubs and wheels	4	5,000	5,670	19	......	14,836
Steam and gas fittings	1	10,000	2,250	20	......	14,000
Stereotyping	1	5,000	500	6	......	4,000
Stone quarrying	1	1,350	500	13	......	5,000
Tinware	3	23,300	20,707	39	4	50,500
Tinners' tools and machines	3	85,000	29,055	108	......	105,535
Toys	1	12,000	8,000	25	25	42,000
Upholstering	3	41,000	131,200	35	19	200,000
Whip lashes	1	5,000	3,000	5	20	7,500
White lead	1	20,000	48,000	12	2	60,000
Willow ware	1	10,000	2,125	30	10	20,000
Woolen goods	8	376,500	403,692	249	148	657,060
Total, including miscellaneous manufactures not above specified	406	$11,171,200	$8,157,227	8,437	3,917	$16,827,016

The city of Hartford contains several noteworthy manufactories, and a few that are really remarkable. It also contains one whose products are known not only in both America, in England, and the continent of Europe, but in the Indies, in Egypt, in Australia, and by the far Asiatic tribes. We need hardly say that the one alluded to is

Colt's Patent Fire-arms Manufacturing Company.

A gentleman intimately conversant with the history of the founder of this establishment, and formerly a member of Congress from Connecticut, has asserted that Samuel Colt, at the age of fifteen, while upon a voyage which he made as a runaway sailor boy to Calcutta, first conceived and wrought out "with a chisel on a spun-yarn, with a common jack knife and a little iron rod, the rude model in a piece of white pine, of that firearm, which now, from the shores of the Pacific to the Japan seas, over the whole civilized world itself, reports the triumph of his skill and blases his fame." This early model is still carefully preserved in the collection of Col. Colt's curiosities, and is certainly a remarkable exemplification at what an early age inventive genius sometimes manifests itself. His original conception, however, was very different from the latest "Colt's Improved." It was the combination of a number of long barrels to rotate upon a spindle by the act of cocking the lock, in the same manner that they have since been made by others, and it was not until he perceived the objections to which they are liable, arising from weight and bulk, that in his study to obviate them, the idea of a single barrel and a chambered breech suggested itself to him. In order to obtain the necessary means to prosecute his experiments and manufacture specimen arms, he traveled the United States and the Canadas as a public lecturer on chemistry, and though only a youth of not more than seventeen or eighteen years of age, he administered, it is said, more laughing gas to more men, women, and children, than any other lecturer since chemistry was first known as a science. In 1835, when not more than twenty-one, he received from the United States Government his first Patent for a Repeating or Revolving Firearm. In the following year he succeeded in engendering sufficient confidence in the minds of a few capitalists to procure the establishment at Paterson, New Jersey, of a company with a capital of three hundred thousand dollars, for the manufacture of the weapon which he had invented. This Company continued in existence until 1842, when they were forced to discontinue operations, after expending the original capital without beneficial results, except those gained in further simplifying the mechanism of the arms and perfecting the machinery required for their manufacture. From the failure of the Paterson Company until 1847, none of these arms were made, and it was not until after the commencement of the war with Mexico, when Gen. Taylor, who had witnessed their utility in the Florida campaign, sent Captain Walker of the Texan Rangers to procure from Col. Colt a supply of revolvers, that an opportunity presented itself to retrieve the embarrassments into which he had been involved. He at once contracted to furnish the Government one thousand arms for $24,000. As a temporary arrangement he hired an armory at Whitneyville, Connecticut, where he completed his first contract, and shortly afterward established the nucleus of his own manufactory at his native place, Hartford. One order rapidly followed another, and the business increased so that constant additions of room, machinery, and workmen, were required. From that time to the present the business has been a constant success, and has resulted in the erection of the most perfect establishment for the manufacture of Firearms in this or any other continent.

Colt's New Armory is located on the west side of the Connecticut River, about one hundred yards south of the mouth of Little River, immediately inside of a dyke which Col. Colt erected to exclude the overflow of the Connecticut River. This embankment is about two miles long, averaging over one hundred feet wide at the base, and from forty to sixty feet in width at the top, and from ten to thirty feet in height. It is built in the most substantial manner, the sides being covered with osier both for protection and ornament. The buildings are of Portland freestone and brick, and consist of four parallels, four stories high, each five hundred feet long, two of them sixty feet and three fifty feet wide, connected by a fifth at right angles.[1] There are also two others of one story in height, five hundred feet long and fifty feet wide. The floors if extended in one line, would be a mile long by fifty-five feet wide, and contain an area of six and a half acres. Running through the centre of the main buildings is a row of cast iron columns, sixty in number, to which is attached the shafting, which is fifteen inches in diameter, and arranged as a continuous pulley for driving the machines as close together as possible, only allowing sufficient space to get around and work them. The motive power is supplied by five different engines, having an aggregate of nine hundred horse-power. One of them was built in Providence, Rhode Island — the others by Woodruff & Beach of Hartford.

Within these buildings there are fifteen hundred separate machines, the majority of which were both invented and constructed on the premises. Every part of a Pistol or Rifle is made by machinery, and being made to a guage, is an exact counterpart of every other piece for the same purpose. Even all the various parts of the lock are made by machinery, each having its relative initial point to work from, and on the correctness of which the perfection depends. Taking the lock frame for instance, they commence by fixing the centre, and drilling and tapping the base for receiving the arbor or breech-pin, which has been previously prepared—the helical ground cut in it and the lower end screwed—once grasped is firmly fixed in its position, furnishing a definite point from which all the operations are performed and to which all the other parts bear relation. The facing and hollowing of the recoil shield and frame, the cutting and sinking the central recesses, the cutting out all the grooves and orifices, planing the several flat surfaces and shaping the

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(1) We regret to learn that while these pages are passing through the press, a large portion of this magnificent structure was destroyed by fire; but as it is the intention of the Company to erect others in their place of the same kind, the description will stand for the past and the future, if not for the immediate present.

curved parts, prepare the frames for being introduced between hard steel clamps, through which all the holes are drilled, bored, and tapped, for the various screws; so that, after passing through thirty-three distinct operations, and the little hand finishing required in removing the burr from the edges, the lock-frame is ready for the inspector. The rotating chambered cylinder is turned out of cast-steel bars, manufactured expressly for the purpose. The machines, after getting them the desired length, drill centre holes, square up ends, turn for ratchet, turn exterior, smooth and polish, engrave, bore chambers, drill partitions, tap for nipples, cut pins for hammer-rest and ratchet, and screw in nipples. In all there are thirty-six separate operations before the cylinder is ready to follow the lock-frame to the inspector. In the same manner the barrel, forged solidly from a bar of cast steel, is bored and completed to caliber, and is then submitted to the various operations of planing, grooving the lower projection beneath the barrel, with which the base pin is ultimately connected, tapped, and then rifled. The barrel goes through forty-five separate operations on the machines. The other parts are subject to about the following number: lever, twenty-seven; rammer nineteen; hammer, twenty-eight; hand, twenty; trigger, twenty-one; bolt, twenty-one; key, eighteen; lear spring, twelve; fourteen screws, seven each, ninety-eight; six cones, eight each, forty-eight; guard, eighteen; handle-strap, five; stock, five.

Besides the exactness and uniformity which are arrived at by the adaptation of machinery, there is additional security in the minuteness of inspection to which each weapon is subjected. As soon as completed and before being polished, the different parts are carried to the Inspecting or Assembling Department, and there undergo a rigid examination. The tools to inspect a cylinder, for example, are fifteen in number, each of which must gauge to a hair so great is the nicety observed, and on finishing his examination the inspector punches his initial letter on the piece inspected, thus pledging his reputation on its quality. Again, after the different parts have been finished, they are once more carried to the assembling room, and each chamber is loaded with the largest charge possible and practically tested by firing; after which they are wiped out by the prover and returned to the Inspection Department. The inspectors again take them apart, thoroughly oil and clean them, when they are for the last time put together and placed in a rack for the final inspection. The orders from the principals being perfection—the slightest blemish, a small scratch in the bluing or varnish, is sufficient to prevent the arm passing this final inspection. But if passed, it is returned to the store room and papered, and then transferred to the wareroom, and is now ready for the market.

Previous to the erection of his new armory, Colonel Colt organized under a special law of the state, the association styled "Colt's Patent Fire-Arms Manufacturing Company," with a capital of $1,250,000, the whole of which is invested in the buildings, tools, machinery, and raw materials. The stockholders were few, he himself being largely the principal, and the others the heads of the various departments of the business. Since his decease the position of President has been filled by Elisha K. Root, one of the most accomplished mechanics of the age, to whom we elsewhere allude as the inventor of some of the most important machines now in use in the manufactory. He invented the "Drops," as they are called, for forging—great hammers raised by screws on racks and dropped by a treadle—the face of the hammer, steel die and anvil, together forming a matrix to shape the red hot steel at a single blow. He also improved the self-operating rifling machines and invented the compound machines which perform many operations without change of cutters. The cam pump attached to the engine which raises the water of the Connecticut to a reservoir on a hill and supplying the factory village, is another emanation of his genius, and is said to perform its work better than the Cornish pump as the stream flows continuous and steady. The other officers are R. W. H. Jarvis, Vice President; Thomas J. Fales, Secretary; Hugh Harrison, Treasurer; Horace Lord, Superintendent—all of them men of large experience in their respective departments.

The Company at the present time are turning out about 250 rifled muskets and the same number of revolving pistols, besides a considerable number of revolving rifles and shot guns. They make forty-four different styles of pistols, six different patterns, eleven different lengths, and twenty-seven different finishes. Of rifles they make three different calibres and five different lengths. The weight of the arms for which the demand is largest, and which are constantly in course of construction, are as follows:

	Pounds.	Ounces.
The military rifle, barrel 36 inches, fitted with improved bayonet	11	8
Sporting rifle, barrel from 18 to 30 inches, average	9	
The army or holster pistol	4	4
The navy or belt pistol	2	6
The pocket pistol, barrel 6 inches	1	12
The pocket pistol, barrel 5 inches	1	10
The pocket pistol, barrel 4 inches	1	8

The barrels of all these pistols and rifles, with the exception of the rifled muskets, are of steel, for which the Company pay about $30,000 per month.

Besides Arms they also manufacture Bullet Moulds, Powder Flasks, and other accoutrements; and they have a separate factory for the production of Metallic Foil Cartridges, a contrivance invented by Col. Colt, that always insures "dry powder" to the possessor. They employ about 1500 persons, to whom they pay monthly over $80,000, or nearly a million of dollars a year. Almost the entire manual labor of the establishment is performed by contract. The contractors are furnished room, power, material, heat, light—while they furnish muscle and skill—themselves and subordinates being all subject to the immediate government, as prescribed by the code of rules laid down by the Company. They number several hundred—some particular manufacturers requiring only their individual exertions, while others employ from one to forty assistants. Many of them are men of more than ordinary ability, some have been connected with the concern since it was first established, and have rendered themselves pecuniarily comfortable by their exertions.

On the 10th of January, 1862, the founder of this vast establishment passed from the scene of his labors, at the early age of forty-seven, his decease being hastened, it is supposed, by mental anxiety and over-exertion. He died at a time when the country most needed his talents and experience in the construction of weapons for warfare. He died in the midst of unfinished projects, which would have made his native city the principal centre in the United States of the manufacture of ordnance, having designed to build foundries, forges, and workshops, to produce every thing necessary to equip an army, or navy, or fortress. He lived long enough, however, to add three millions of dollars to the taxable property of Hartford; to redeem from annual or semi-annual overflow by the Connecticut River, 250 acres of land within the city limits; to build two complete villages, now inhabited by several hundred families, having their Gas Works, Public Hall, Stores, Society for Mutual Relief in case of sickness, Military and Quadrille Bands, and to enrol his name among the foremost in the list of America's most famous inventors.[1]

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(1) It was not only in the department of arms that Col. Colt's mechanical genius displayed itself. He also invented an apparatus for blowing up vessels and for coast and harbor defence which, in his own hands, was signally successful, and for a time experimented upon under the patronage and at the expense of the American General Government. It was while engaged upon this submarine battery, and as auxiliary to it, Col. Colt—to his great additional fame as a man of rare inventive genius—constructed the *first submarine telegraphic insulated wire* which was ever put under water—and which he operated with perfect success, first at New York—from the city to Coney Island, and to Fire Island—from the Merchant's Exchange Reading-Room, crossing several streams of water, down

Sharps' Rifle Manufacturing Company.

On September 12th, 1848, Mr. Christian Sharps, a native of New Jersey, then residing in Cincinnati, received a patent for an improved Breech Loading Gun, claiming as his invention, "the combination of the sliding breech with the barrel, the breech supporter and the stock, in such a manner as that when the sliding breech is forced down, the breech bore will be so exposed as to enable it to receive a cartridge on a line with the bore, and when the sliding breech is forced up, it will shear off the rear end of the cartridge, so as to expose the powder to the fire communication, and will finally and securely close the breech bore." He also claimed as his invention the combination of the cap-nipple with the sliding breech. This is the first account of what we believe was the first perfectly successful Breech Loading Rifle. The importance of the invention is attested by the fact, that for more than a hundred years the ablest writers on gunnery have asserted that the breech, and not the muzzle, is the proper place in which to deposit the charge; and ever since the origin of Firearms, the attention of ingenious men has been directed to accomplishing the object. Robins, whose work was published in the first half of the last century, and which is acknowledged as a standard, refers to the Breech Loading Rifles of his day, and says, "Somewhat of this kind, though not in the manner now practised, would be of all others the most perfect method for the construction of these sort of barrels." Experience has confirmed the correctness of the opinion of this ancient experimentalist, and established the fact that success in warfare depends more on the character and efficiency of the weapons used than upon the number or courage of the combatants.

In one of the Mexican revolutions in 1858, Colonel Suasue, at the head of 1,000 men, armed with Sharps' Carbines, attacked Governor Manero, who was in command of the Government forces, and achieved a most signal victory at San Louis, Mexico, killing upwards of 600 men, taking the city and making prisoners of Governor Manero and three of his colonels, with a slight loss. In the same year, on our western frontier, Colonel Wright's command, armed principally with Breech Loading Carbines, utterly routed, without the loss of a man, a large band of Indians who had previously defeated Colonel Steptoe's forces, who were

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to the mouth of the harbor—and afterward operated with it in the offing at Boston. His sub-marine cable differed only from the Atlantic cable recently lost, in this respect, that in the latter gutta percha was used as an insulator, and in the former, gutta percha being then unknown, a combination of cotton yarn with asphaltum and beeswax was used around the wires, enveloped in a metallic pipe as insulator.

armed with the old muskets and carbines. In the present Rebellion the efficiency of weapons loading at the breech has been so signally demonstrated as to leave no room for doubt. At Springfield, Mo., the "Fremont Body Guard," of 250 men, armed with Colt's Revolvers and Repeating Rifles, firing eighteen shots to the man, routed 1500 rebels, though the latter were acting on the defensive and chose their ground, while the former were crowded into a narrow lane between timber, and subjected to the cross-fire of the enemy. At Yorktown, a single man with a Breech Loading Rifle, kept a 100 pounder gun silent for days. At Fredericksburg, a single company, only partially full, silenced an entire rebel battery across the river, six hundred yards distant. At Pine Bluff, in Arkansas, 550 men, armed with Sharps' Rifles, defeated and actually drove away four thousand under Marmaduke, though the latter had the advantage of being provided with artillery. The preservation of Gen. McClellan's army in his seven days retreat, is said to have been due mainly to a Connecticut regiment, armed with these Rifles, coming forward on a critical occasion; and the wonderful victory at Mission Ridge near Chattanooga, to the fact that a portion of the Federal forces engaged, were armed with Spencer's Breech Loading and Repeating Rifles: "Who," said a prisoner, "could withstand men that kept shooting and never loaded?" Such is the brief outline of the record that has been made in actual service by Guns loading at the breech.

In view of these facts it would be singular indeed if eminent military men, sincerely desirous of promoting the nation's welfare, had not expressed opinions in their favor and recommended their adoption. Major-General Rosecrans has stated (November 13, 1863) that he had no doubt that could such arms of proper construction be substituted at once for those now in use, it would add not less than fifty per cent. to the force or power of the troops now in the field, or, "in other words, we should augment our army one-half by changing the weapons." The Government, he informs us, has already become convinced that breech-loading, revolving-chambered or single-charged arms should be used for Cavalry and other mounted troops,—and adds, "it should, and in my opinion will, ultimately adopt them for infantry." It is certainly most unfortunate for the present executive officers of the government that the resources of the establishments engaged in making these arms are not more than sufficient to supply the Cavalry troops, for it cannot be supposed that the Administration could be guilty of forcibly conscripting men if it were in their power to augment the army "one-half by changing the weapons."

The history of the Sharps' Rifle Manufacturing Company is briefly as follows: It was incorporated in 1851, with a capital of $100,000. Mr.

JOHN C. PALMER, of Connecticut, was elected the first President of the Company, and has occupied the same position in relation to it ever since, discharging the duties with marked ability. Mr. R. S. LAWRENCE, of the firm of Robbins & Lawrence, manufacturers of firearms at Windsor, Vt., was invited, soon after its incorporation, to take charge of the mechanical department as Master Armorer—and most of the improvements that have been made in the establishment are the result of his experience and practical skill. The buildings originally erected were small in comparison with their present extent. The main Armory was about 160 feet in length by 60 feet wide, two stories high, with an L containing the Forge Shop, etc. Recently new buildings have been erected, and will soon be filled with machinery and workmen, which will more than double the present resources of the works. The main building is 215 feet long by 45 wide, and four stories high including the basement. The Assembling Room occupies the entire first story, without a partition, and is a most imposing and spacious hall, as may be imagined from the length and width of the building which has been already stated. In the basement is an engine of 250-horse power, made by the Corliss Steam-Engine Company of Providence. It is a horizontal single-cylinder of 26 inches in diameter, having a driving-wheel of 20 feet in diameter, and is intended to propel the machinery of the whole establishment. It will be run as a low-pressure engine in summer, and high-pressure in winter, the exhaust steam in cold weather being used to heat the buildings.

The processes and tools employed in the manufacture of a Sharps' Rifle are not essentially different from those in use in other Armories. The Barrels are cut from round steel bars, large enough to finish to the required diameter at the breech, and then tilted, or drawn under heavy trip-hammers, until the required taper is attained. These bars of steel, soon to become barrels, are then bored by upright machines, then turned, and finally rifled. The groove in a Sharps' is similar to that in the Springfield rifle-musket, broad and shallow. Nearly all the work is done by machinery. No part of the rifle or its appendages is made out of the establishment, and many of the tools and machinery in use were also made by the Company under the supervision of Mr. Lawrence. The "drop" for finishing the formation of the forgings are hand-drops, operated by means of hand-belt and pulley. Every thing is formed by dies of steel, so that every piece of forging is a counterpart of another for the same purpose. The rifling machines are remarkable specimens of mechanical finish and accuracy in working. Milling, forming, and compound machines perform operations which seem to require the exercise of the most exact and almost human intelligence.

Since it was first invented, improvements have been made upon the original Rifle which obviate all the objections that have ever been alleged against it. One of these objections was the escape of gas at the time of firing. This has been remedied by inserting in the slide which closes the rear end of the barrel, a steel ring, attached to a face-plate around the circumference of a concavity in the centre of which the vent enters. This ring is called a "gas check," as the action of the charge when fired forces it out an imperceptible distance against the rear end of the bouching so as to close the joint and prevent the escape of any portion of the force of the fired charge. In 1859 an improvement was made which obviates the necessity of having a portion of the cartridge exposed, as originally required; and now in loading a Sharps' Rifle the cartridge can be forced into the barrel as far as the chamber will allow it without hazard that the fire of the primer will not reach it.

The Sharps' Rifle, as now constructed, is unquestionably one of the most effective of modern weapons. The barrel is of cast-steel, bored from a solid bar, round, not octagon in shape, at the breech, and having a thread cut on the exterior, instead of the interior, as all muzzle-loading pieces have, for the reception of the breech-pin. This Rifle has no breech-pin. The base of the barrel screws into a frame of iron, through which, between the lock and barrel, is a "slot" or mortise running transversely to the line of the barrel from the upper to the under-side of the gun. Fitting accurately in and sliding through this slot is a block of steel, one side of which comes squarely against the end of the barrel, thus forming a gas-tight breech-pin. On this sliding block is the nipple on which the hammer strikes. The bottom end of the block is attached by a pivot to the "guard strap" of the trigger, which, being hinged at its forward end, can be depressed by the thumb, thus bringing down the sliding breech and exposing the rear end of the barrel-bore for the reception of the cartridge. This is the grand peculiarity of a Sharps' Rifle. But it has another. It requires no capping, though it has a tube or nipple for the use of caps if preferred. It can be fired fifty times without renewing the primers. These primers are little flat discs of copper, containing, between two thicknesses of the metal, the fulminating paste. They resemble the top of a common percussion cap or minute copper wafers. Back of the nipple, and directly under the hammer, is an aperture closed by a slide, that can be moved by the thumb. Into this aperture, leading to a magazine, is dropped a tube of fifty primers, each entirely detached from the other, so that the danger of spontaneous explosion, urged against the Maynard or tape primer, is entirely obviated under this plan. Caps may be used, even when the magazine is charged, simply by shutting the slide. In firing, a single primer is thrown under the hammer directly on to the tube by the action of a lever inside the lock, which moves simultaneously with the hammer, and never misses capping the nipple just in time, no matter in what position the piece may be held at the time of firing.

For rapidity of firing the Sharps' Rifle is remarkable if not unrivalled. In the testing range at the Works, the piece is frequently loaded and fired twenty-six times per minute. An inexperienced practitioner finds no difficulty in firing and loading from ten to fourteen shots per minute. Its simplicity of construction, freedom from accident, and facility of cleaning, as well as its accuracy and rapidity of firing, have given it a popularity, both as a weapon of warfare and for purposes of sport, that places it among the most successful and remarkable of modern inventions.

About 450 men are now employed in these works, and about 30,000 Rifles are produced annually. When the new machinery is in full operation it is probable the production will be doubled.

Woodruff & Beach Iron Works,

Is the corporate title of a Company incorporated in 1853, and are the successors immediately of Messrs. Woodruff & Beach, and remotely of Alpheus & Truman Hanks, who, under the firm-style of A. & T. Hanks, established in 1821, at the same location, the first Iron Foundry in Connecticut, known as the "Hartford Iron Foundry."

The works of the Company have for several years been among the most extensive in New England for the manufacture of Engines and heavy machinery, and recently large additions have been made to the foundries, consisting of a centre and two wings, 230 by 63 feet inside area. The centre will contain a pit capable of holding the mold for the heaviest castings ever founded, and two immense cranes, with a working radius of a circle forty-three feet diameter, and a lifting capacity of fifty tons each. On the river is a dock fifty feet long, sustained on piles, with a shears the two legs of which are two single sticks each ninety-eight feet long. This enormous engine rests on two piers of stone sunk in the river bed twenty feet, and is guyed by cables of wire rope. It is for loading engines and boilers into the ships which they are afterwards to propel. It has a capacity for moving masses of seventy-five tons. To this apparatus runs a railroad from the machine and boiler shops, which is supported on piles driven through the sandy strata of the earth to the "hard pan." An addition has also been made to the boiler shops of a brick structure 125 feet long and 60 feet wide.

To enumerate all the important engines and machines that have been constructed at these works would require more space than we can devote to the subject. The celebrated engines for the Brooklyn, N. Y. waterworks, which are the admiration of mechanics, were built at this establishment. They are constructed on a novel plan, without crank or wheel, every motion being reciprocating. The pumping apparatus for the Hartford Waterworks was also built here, and is known as the *Double-Piston* Pump. It consists of one cylinder and two pistons, as its name indicates, the working-rod of one being hollow to admit the rod of the other working in the same; and these pistons are provided with flap-valves, and are caused to rise and fall by an ingenious combination and arrangement of parts, in such order and in such relation to each other as to cause one of them to be rising and performing its function of moving the column of water upward at all times; so that, the inertia once overcome, the column of water is kept continually and uniformly moving forward without cessation, with a small power for keeping up its velocity compared with that which was originally required to start it, and which is necessary to put the water in motion at every stroke of the ordinary pump. The advantage thus derived is obvious.

This Company also built the engines, 200-horse power, which drive the machinery at Colt's Works, and many others of great size now in successful operation in manufactories throughout the country.

In another and more difficult department of mechanics, Messrs. Woodruff & Beach have attained even still more eminent success, and that is in the construction of Marine Engines. The two transports *Dudley Buck* and *George C. Collins*, which have been employed by the Government for over two years, are propelled by engines built by them, and have never missed a single trip for repairs. The engines of the *Nipsic*, a steam gunboat, have sustained a trial of ninety hours constant action at the dock, and three months at sea, without the heating of a journal—a fact almost without a parallel. This ship has one propeller wheel, which, with the engines, was constructed here. The wheel is of composition (brass), 11 feet diameter, and of 3,500 pounds weight, in a single casting.

The *Pequot*, built at the Navy Yard, Charlestown, Mass., has a pair of engines built here, of very peculiar construction, on a plan never before attempted. They are reciprocating engines, but the cylinders, instead of being straight, are curved, being segments of a circle, or, in other words, bent tubes. They are thirty inches in diameter. The piston rod is a complete circle, swinging vertically on a pivot, passing through a hub which connects with the periphery by arms or spokes. The motion of the piston, turning back and forth through the arc of a circle, determines the rotation of a crank by means of a connecting-rod leading without cross-head directly to the piston-rod itself. The steam-chest is connected with the cylinder, and the valves are worked by eccentrics precisely as in a common horizontal engine. As there are neither slides nor crossheads, much of the friction is avoided. The boring of these bent cylinders is the most curious process in their manufacture, yet it is perfectly simple, and no more difficult than that of the straight cylinder. Simple however as it will appear to any one who witnesses the process, it is difficult to describe without the aid of cuts.

Besides the Nipsic and Pequot, this Company built the engines for the U. S. sloops-of-war Mohican and Kearsarge, and the gunboat Cayuga.

Messrs. Woodruff & Beach, at the time of our visit, were finishing engines for the government transport *United States*, of 1,250 tons burden, which was about ready for launching at Gildersleeves' yard, Portland, on the Connecticut. The boiler for this ship is cylindrical, and fourteen feet diameter, weighing about forty tons. They now have contracts with the government for the machinery for three steam sloops-of-war (propellers), which will be among the most effective vessels afloat for speed and weight of battery. The cylinders of these engines will be sixty inches diameter, stroke 36 inches, working propeller wheels of composition 17 feet in diameter, and weighing about 12 tons each. The journals of the shafts will be thirteen inches in diameter and forty-five inches in longitudinal bearing. The rudders, also of brass, will be cast here. Some of the iron castings for these engines will weigh not less than thirty tons. The amount of metal in a mass of that weight is hardly comprehended under the familiar terms of pounds and tons. When one of these masses is being cast, the interior of the vast foundry is an inferno of smoke, flame, and corruscations; streams of molten incandescent iron, in slow but irresistible flow, empty into the pit, which is a seething, bubbling cauldron of liquid metal.

It is evident, from what has been said, that the Woodruff & Beach Iron Works have facilities for constructing the heaviest machinery, and have every apparatus that can assist the human arm in moving and working immense weights and masses of metals. The President of the Company, SAMUEL WOODRUFF, has been connected with the works since 1840, and the Treasurer, HENRY B. BEACH, since 1842. About 450 hands are now employed in the establishment.

P. Jewell & Son's Belting Manufactory.

This is said to be the largest manufactory of Leather Belting in the world. We do not vouch for this, for though our facilities are unequalled for ascertaining the comparative business of leading manufacturers in the country, we have no means of knowing how large and important the establishments are in foreign countries. It is sufficient to say that the Messrs. Jewell convert five to six hundred hides into belts weekly, and produce an average annual value of from six to eight hundred thousand dollars.

The leather which this firm use in the manufacture of Belts is made at their own tanneries, located in Michigan, and at least a year is consumed in the various processes incident to its production. The hides are tanned whole instead of in sides, as the "back piece" is the choicest, from which are made the great twenty and thirty inch Belts. The leather when received from the tannery is placed in vats filled with a strong decoction of tannin, and is kept in perpetual motion by means of wheels with floats like those of a steamboat. This makes the leather soft and pliable. Taken from the bath it is placed upon a table and curried, rubbed, scraped, and kneaded, until every portion is uniformly soft. An expert then takes the hides and cuts them into strips, the "back piece" being always reserved for the wide Belts. This cutting is not determined by the wish of the proprietors or workmen, but by the capacity of the hide as interpreted by an expert. Still wet, the strips are placed in machines which stretch them as far as they can bear while wet, which is known by the water being forced from the substance to the surface, consequent on the closing of the cells from which the gelatine has been expelled in the tanning process. In drying, the leather becomes susceptible of still greater tension, and is again subjected to the rack until it is certain that its use as a Belt will not stretch it further, which would be a gain in length at the expense of width and probably straightness. The strips, now quite uneven on the edges, owing to the different degrees of density in their substance, are rolled to consolidate the fibres, and rubbed one way by a machine, which by an indescribable system of levers comes in contact with the leather on one stroke, for the purpose of consolidating the fibres and inclining them one way. Still another machine is used for the same purpose, on which the leather is fixed and drawn slowly under a steel scraper or smoother, which by "toggle joints" is brought with immense pressure upon its surface. The leather is now cut into strips of different widths for Belts, which requires workmen of

U.S.

experience, with a culture of the eye and a sensitiveness of touch truly astonishing.

The "laps" or ends of the strips are shaved by a simple machine, cemented with a glue so tenacious that the Belt will part anywhere as soon as at the splice, then riveted and made ready for the market. The riveting with copper straps over the edges of the "lap" is a patent owned by the company, as is also the plan of making round Belts, solid instead of hollow. These round Belts are in great demand for mowing machines, nearly nine miles having been ordered recently at one time by a single manufacturer. It is a singular anomaly, that the demand for Belting has since the war been greater than ever before—pushing the resources of this vast establishment to its utmost capacity.

Besides leather for Belting this firm manufactures Lace Leather. This is made from the hides of East India or Patna cattle, which are imported by them direct from Calcutta. They are simply cured in salt, alum, and hot tallow, and do not undergo the ordinary process of tanning.

Hartford has also in the establishment of SMITH, BOURN & Co., a very extensive and, in some respects, a remarkable Saddle and Harness manufactory. It was founded by Normand Smith, the father of the present partners of that name, in 1794, and is probably the oldest established manufactory of its class in the country.

Within the last fifty years great improvements have been made in this, as in other branches of manufactures, especially in saddles, and to this firm equestrians are indebted for much of their present security, ease, and comfort. The American saddle, it is generally conceded, is superior to the English, for though the same material (hog skin) is used for the best saddles in both countries, the American has the advantage in shape and comfort to the rider. In this country buckskin is frequently used for the seats and horns of ladies' Saddles. This firm, however, make Saddles adapted to all the principal markets of the world, including the English, Spanish, Mexican, California, and Sandwich Island Saddles, the styles of all which are different.

Within the last half century there has also been a great change in the modes and facilities of manufacturing. Presses and stamps now form ornaments, which, if attempted a half century ago, were the result of painful and protracted manual labor. The sewing machine has in a great measure superseded the awl and "waxed end." This firm has ten large sewing machines, constructed with special reference to the resistance of material, which, as in tugs or "braces" of solid leather seven-eighths of an inch thick, is often considerable.

No one, unless he visits a manufactory like that of Smith, Bourn &

Co., can form any conception how numerous and varied the articles are that are comprised in the term "horse furniture." The range in modes of ornamentation is almost as limitless as man's imagination, and the styles are as varied as his tastes, whims, or caprices. This firm are extensive manufacturers of horse and mule collars, which are sold largely to the Western States. It is a singular fact that since the commencement of the present rebellion, the demand for their manufactures has been greater than ever before; the Western and Northern States more than supplying the deficiency of the Southern market. As many as five hundred hands have been employed in this establishment at one time, though the value of the average product of this manufactory is about $200,000 per year. The firms of J. T. Smith & Co. in New York, and Smith & Brother in New Orleans, are branch establishments of this house.

Hartford has also one of the most important Silk Manufactories in the United States—that of the CHENEY MANUFACTURING COMPANY. This Company have for several years made sewing silks that, as competent judges assert, surpass in quality the best made in Europe. It is preferred for use on sewing machines on account of its strength, uniformity of twist and beauty of finish. Within a few years this Company have made great progress in weaving silk goods by power looms, and are now making printed as well as plain dyed silk fabrics, which give assurance that the day is not distant when American Silks will rival in every respect those made in France. The Cheney's have a manufactory in South Manchester as well as in Hartford, and employ a capital of about $600,000.

The HARTFORD CARPET COMPANY, though its mills are at Thompsonville and Tariffville, villages in Hartford County, may without impropriety, be noticed among the manufactories of the city. The Company have a capital of $1,200,000, and have machinery and the capacity to produce annually, 1,700,000 yards of Ingrain Carpetings, 500,000 yards of Venetian Carpetings, 200,000 yards of Brussels Carpetings.

The Brussels Carpets made by this Company have been pronounced by competent English judges to be most creditable specimens of American manufacture. Mr. WILLIAM ROBERTS is President and GEORGE ROBERTS Treasurer of the Company.

At HAZARDVILLE, near Hartford, are the extensive Gunpowder Mills of the HAZARD POWDER COMPANY, who have mills also in the towns of East Hartford and at Canton. This Company have 18 sets of rolling mills, with 36 iron wheels, each wheel weighing eight tons; 7 granulating mills; 5 screw-press buildings; and 3 hydraulic-presses of five hundred tons each, in different and separate buildings; and about fifty buildings used for dusting, assorting, drying, mixing, pulverizing, glazing, and packing-houses—with extensive saltpetre refineries and magazines, cooper, iron, wood-working and machine shops—in all about 125 buildings at their main works at Hazardville and Scitico, extending a distance of over a mile in length and half a mile in width. To propel this vast mass of machinery 25 waterwheels and 3 steam-engines are required.

This Company manufacture annually over a million dollars worth of Powder of various kinds, known as Government, Sporting, Shipping, and Mining Powder, of which large quantities at one time were exported to Europe. During the Crimean War they supplied the British Government with ten thousand barrels of powder, which officers of the British Army certify was of very superior quality. The Works were founded many years ago by Colonel A. G. HAZARD, who is now President of the Company.

NEW BRITAIN, ten miles west by south from Hartford, on the Providence, Hartford and Fishkill Railroad, is distinguished for the intelligent enterprise of its inhabitants, who, without water privileges of any amount or any peculiar natural advantages, have established a great variety of important manufactures. The Russel & Ervin Manufacturing Company have here an extensive manufactory of Locks and miscellaneous Hardware,—a catalogue and price-list of the various articles made by them fills an octavo volume of over 200 pages. The Landers & Smith Manufacturing Co. and P. & T. Corbin are also extensively engaged in manufacturing Cabinet-Makers' and other Hardware. Besides these, Saddlery Hardware is made by the North & Judd Manufacturing Company and H. Butler & Son; Wrought and Cast Iron Door Bolts, Hinges, etc., at the Stanley Works; Sash Fasteners, Window Springs, Axle Pulleys, etc., by Judd & Blakeslee; Malleable Castings at the Malleable Iron Works; Wrought Cow and Sheep Bells by Charles L. Baldwin; Hooks and Eyes by North, Stanley & Co.; "Isham's Patent" Bank and Safe Locks by the New Britain Bank-Lock Co.; Umbrella Frames by J. Shepard & Co.; and miscellaneous Hardware by the Humason Beckley Manufacturing Company and Edward Doen. The Stanley Rule and Level Company, who are leading manufacturers of Rules, Levels, and Squares, have their works in New Britain.

In addition to Hardware, there is a manufactory of Jewelry (Churchhill, Stanley & Co. proprietors); and the New Britain Knitting Co. are manufacturing cotton and woolen Shirts and Drawers largely. There are also three manufactories of Shirts—of which the proprietors are William Bingham, J. N. Lee & Co., and Julius Parker. The various establishments produce annually about $2,500,000.

At Kensington, near New Britain, the Hart Manufacturing Co. have an important manufactory of Builders' and miscellaneous Hardware.

MANUFACTURES OF MERIDEN.

Seventeen miles southwest from Hartford, on the Quinepiack River and the Hartford and New Haven Railroad, is Meriden, another important manufacturing town in Connecticut.

In 1832 Mr. Charles Parker commenced here the manufacture of Coffee Mills, employing at first only three or four men, and to his business energy and successful enterprise the town is largely indebted for its present industrial importance. Probably there is no one now living whose history, if the facts could be obtained, would illustrate more satisfactorily the means by which immense enterprises are developed from insignificant beginnings. Mr. Parker is now the proprietor of four large manufactories, located at different places in Meriden and its vicinity, and some of them comprise so many departments for the manufacture of distinct articles that they might be regarded as several distinct establishments. His principal factory, located at Meriden centre, is an aggregation of numerous buildings that cover an area of more than two acres of ground. Here are manufactured Coffee and Corn Mills, Patent Bench Vises, Plated Wares, and Sewing Machines. His Coffee Mills have long been standard articles with the hardware trade, and with the recent improvements, are not surpassed by any in this country. They are now made having a combination of two sets of runners or grinders—the first or upper set cracking the coffee, spices, wheat, or rice, and the second or lower set grinding them as fine or as coarse as may be desired by means of a regulating screw acting on the lower runner. His patent Parallel Vises are in general use in all New England manufactories. The Plated Spectacles, Spectacle Cases and Tobacco Boxes, are made by patented machinery so expeditiously and cheaply that the demand for them is very extensive. The Parker Sewing Machine is manufactured under the patents of E. Howe, Jr., Wheeler & Wilson, and Grover & Baker, and makes the double-lock stitch, with the tension so arranged that the stitch lays perfectly flat and smooth on the under side. The parts are all adjusted before leaving the factory, and are pinned together in such a manner as not to get deranged by using. This machine has very many valuable qualities, is one of the simplest now made, and the sales, not only in this country but in Europe and South America, are very large. Recently, Mr. Parker erected an extensive building adjoining these works, and is now fitting it up with newly patented machinery for the manufacture of Gimlet Pointed Screws. This enterprise, if successful as it promises to be, will be welcomed with great satisfaction by all dealers in American Hardware.

At Yalesville, three miles from Meriden, Mr. Parker has an extensive manufactory of Britannia, German Silver and Plated Wares of all kinds. Large quantities of Britannia Spoons, and Plated Spoons and Forks, are made here by machinery. At another manufactory, east of Meriden, Hammers, Iron Table, Tea and Basting Spoons, and Ladles and Flesh Forks are made largely; while at a fourth manufactory, about two miles west of Meriden, Mr. Parker makes Scales, Door Handles, and a very popular Patent Hinge and Fastening for window blinds, which are designed to secure the blind in any position that may be desired.

Mr. Parker is also a principal proprietor in the extensive machine works of PARKERS, SNOW & Co. This concern was founded in 1839 by Oliver Snow, an ingenious and skillful mechanic, and after having passed through numerous changes of firm style—Snow, Hotchkiss & Co., Oliver Snow & Co., the Meriden Machine Company, Snow, Brooks & Co., Parkers', Snow, Brooks & Co.—it is now an established and important concern under the proprietorship of Parkers, Snow & Co., and well known to machinists and manufacturers for its ability in constructing substantial and fine Machinery, Steam Engines, Mill Gearing, Printing Presses, and Machinists' Tools. Among the special articles made here, are Farnam's Double Acting Lift and Force Pumps, Burnell's Patent Rotary Pumps, the Fowler Punching and Shearing Presses, and Kerosene Lamp Tops and Trimmings.

Recently this firm fitted up an extensive Armory, with all the modern machinery, for the manufacture of Springfield Rifled Muskets, which they are now producing at the rate of a hundred a day. They are also owners of the very valuable breech-loading magazine carbine known as the Triplett & Scott Carbine, and are preparing to make the weapon in large quantities.

In all these establishments more than 1000 men and 100 women are furnished employment, and their monthly pay-roll for labor is from thirty to forty thousand dollars.

The second most extensive manufacturer in Meriden is Jedediah Wilcox, the present senior partner of the firm of J. WILCOX & Co., who, in 1860, manufactured Skirts, Leather Belts, and Carpet Bags, to the amount of $570,000. His history supplies another addition to the remarkable instances of successful enterprise.

For four years, from 1845 to 1849, Mr. Wilcox labored industriously in the manufacture of Carpet Bags, and at the end of that period had accumulated a capital of only $1,500. He then associated with himself a partner, who contributed an equal sum, and in 1850 their sales amounted to $75,000. This partnership, however, did not continue beyond the year, when Mr. Wilcox purchased his partner's interest, and having added the manufacture of Belts to that of Carpet Bags, his sales rapidly increased until, in about four years, they amounted to $300,000 a year. In 1855 he embarked in the manufacture of Hoop Skirts, which soon became so much in demand, that in less than one year the sales of these alone amounted to $300,000. For several years these have been the leading article of the firm's manufacture, though recently they have added Corsets. The principal manufactory of the firm is a building in West Meriden, having a front of 160 feet and an average depth of 115 feet, where about 400 dozen Skirts are made daily and a proportionate quantity of Corsets. Besides these, two other shops in the town are employed in making Skirts for the firm.

Since 1860 Messrs. Wilcox and Co. have made the Tape used in Skirts, and occupied a building for the purpose that is 135 by 40 feet. To this an addition has been made 100 feet long by 40 feet deep, 2½ stories high, and another 60 feet square and 4 stories high, both of which are being filled with costly machinery for the manufacture of Balmoral Skirts, the dyeing as well as the spinning of the yarn being done on the premises. They have also just completed a large boarding house for the convenience of the operatives, of whom from 700 to 800 are now employed in the various manufactures. When the manufacture of Balmoral Skirts is further established, this firm expect to increase their sales to the amount of a million and a half of dollars per annum, which will make it the largest manufactory of the kind in the United States.

Besides these concerns, which make about one-half of the total product of the town of Meriden, the next three largest are the Meriden Britannia Company, which in 1860, employed 320 hands and produced a value of $480,000; the Meriden Cutlery Company, which employed 126 hands and manufactured to the amount of $167,000; and Read, Pratt & Co., who manufactured Ivory Combs and Piano Ivory to the amount of $175,000. A consolidation of all the principal firms engaged in the manufacture of Ivory Combs in the United States, has been recently effected, and their principal factory at Meriden. The Malleable Iron Works of M. C. Augur & Company employed thirty-five hands; the Caster Manufactory of Foster, Merriam & Co., employed thirty hands; the Clock and Bell Manufactory of Bradley & Hubbard, employed sixty-two hands; the Hoop Skirt Factory of Charles P. Colt, employed ten men and eighty women; while sundry manufactories of Brass and Plated goods, Lamp Trimmings, Japanned and Tinware, Machine Castings, Soap and Candles, Fertilizers, Carriages, etc., contributed to make up the aggregate product of $2,786.000.

MANUFACTURES OF NEW HAVEN.

According to the Census of 1860, there were in the city of New Haven 216 manufacturing establishments, having a capital of $3,980,465, employing 4,926 males, 3,110 females, and producing a value of $8,835,663, or about one-third of the aggregate product of the county. The leading business was the manufacture of Carriages, of which there were 41 manufactories, having a capital of $1,174,000, and which employed 1,774 men and 55 women, and produced Carriages to the amount of $2,462,057. A brief account of the history of this important business, in the leading centre of its manufacture, deserves to be recorded.

One of the earliest Coachmakers in New Haven of whom we have any account, was Mr. John Cook. He commenced business there in 1794, in a shop in the rear of his house on Chapel Street, and on the north side of where Orange Street now is, opposite to the factory of his sons, Messrs. Thomas & George Cook. At that period the principal pleasure carriage was a Chaise or Gig, and it was not until just previous to the war of 1812 that four-wheeled carriages were introduced. In 1809 a circumstance occurred that has indirectly exerted more influence than any other in making New Haven the principal seat of carriage-building in New England. A young man named James Brewster, while travelling in a stage-coach on his way to New York, was detained in New Haven by an accident to the coach; and while walking around the town "happened in" to Cook's Carriage Shop on Orange Street, and had an interview with the proprietor which induced him to locate in New Haven. In the succeeding year (1810) Mr. Brewster commenced business in a little shop on the corner of Elm and High Streets. At that time the aggregate annual production of all the Carriage manufactories in the town did not exceed $30,000, and the quality of the workmanship was very indifferent, the journeymen being generally paid in trade. Drinking customs prevailed among them to a disastrous extent, and the morals of the "craft" were not of a high order. Mr. Brewster's first object was to attract to New Haven a superior class of workmen, by offering good wages, payable in cash, and to educate them to a higher sense of their responsibilities by Lectures on moral and practical subjects, which he delivered to his employees in the evening. He also originated and sustained a course of scientific Lectures, by such men as Professor Silliman and Olmsted, and paid a thousand dollars a year to a gentleman to aid Prof. Silliman in preparing the Lectures, which were illustrated by experiments.

In 1827 Mr. Brewster opened a repository in New York, and employed as his principal salesman John R. Lawrence, who is now the senior partner of the firm of LAWRENCE, BRADLEY & PARDEE.

In 1829 Mr. Lawrence was taken into partnership by Mr. Brewster, and in the succeeding year Solomon Collis was admitted as a partner, establishing the firm of Brewster & Lawrence in New York, and Brewster & Collis in New Haven. These continued until the first of February, 1837, when Mr. Brewster retired from business, disposing of his interest to his partners, who continued business under the firm-style of Lawrence & Collis in New York, and Collis & Lawrence in New Haven, until 1850, when Mr. Collis disposed of his interest in New Haven to William H. Bradley, and in New York to his partner, who soon after associated with himself L. A. Durbrow and his son John Lawrence, under the firm-style of John R. Lawrence & Co. The business was conducted at New Haven by Lawrence & Bradley until January, 1857, when Mr. William B. Pardee became a partner, establishing the present firm of Lawrence, Bradley & Pardee. In the same year they enlarged their factory to its present size, which is 200 feet in length and 45 feet in width.

This firm and their predecessors have probably constructed a greater variety of Carriages, of all kinds and sizes, from a child's carriage to the largest and most expensive coach, than any other in the country. During the last few years they have supplied large orders for Carriages from Cuba, Mexico, South America, Africa, and Australia. The trade in carriages with the West Indies is rapidly increasing, as it has been found that American woods are more durable in warm climates and less liable to crack than those of Europe. Important orders have also been filled for Prussia, and other portions of Germany. Since the Exhibition of 1851 American Carriages have been growing in favor in Europe. Great improvements of late years have been made in upholstering and leather work, and in the article of enamelled leather, it is said, American manufacturers are even now excelling all foreign competitors.

The manufactory of this firm is managed in accordance with a system perfected by experience. About 200 hands are employed in it, generally by the day, and consequently they have no inducement for slighting their work. Each department has its foreman, and light and heavy carriages are considered as distinct articles, and made in different parts of the factory. For the convenience of their distant customers they have prepared an expensive illustrated volume, containing the largest collection of carriage-cuts ever issued. Over 200 different styles of vehicles are shown in this work, and yet these compose but a part of the styles they are constantly manufacturing. They guarantee, we believe, full satisfaction to any one, from any part of the world, who will accompany his order with an accurate statement of his wants, including width of track required, height of wheels and body, whether light or heavy, and designed for rough, hilly, sandy or smooth roads, with or without perch, with shafts or pole, or both—color of painting, trimming, stitching, and plating—the kind of axles and springs—and the material for trimming, whether leather, cloth, or silk. Nothing would perhaps better illustrate the progress that has been made in American carriage-building within the last half century, than a comparison of the establishment of Lawrence, Bradley & Pardee and its facilities for expeditious work, with the best factory in New Haven at the time when Mr. Brewster, its founder, was detained there by an accident to the stage-coach.

The man who first applied machinery propelled by steam-power to the manufacture of Carriages in New Haven, is Mr. GEORGE T. NEWHALL, now one of the most extensive and enterprising manufacturers in that city. Having noticed, while on a visit to Rhode Island, that steam-power was employed in almost every branch of industry in that small but enterprising State, he resolved to attempt it in carriage-building, and purchased a small engine and the requisite machinery and put it in his factory. It seems scarcely credible to be told that, at a period so recent, his experiment was regarded with such distrust that creditors refused to extend him any further credit, and his best friends looked upon him as an early candidate for the insolvents' court, if not a lunatic asylum. But success crowned his efforts, and we suppose his establishment is the one referred to by Mr. Chauncey Jerome, in his work on American Clock-Making, where he says—"I live in the immediate vicinity of the largest Carriage manufactory in the world, which *turns out a finished Carriage every hour!* much of the work being done by machinery, and systematized in much the same manner as the clock-making."

Mr. Newhall's manufactories are situated about a mile north of the centre of New Haven, on a tract of land which fourteen years ago was a corn-patch and a cow-pasture, but which is now laid out in broad streets, and contains neat dwelling-houses, extensive factories, churches, and school-houses. The main building is 235 feet long, 35 feet wide, and three stories high. This is filled with machinery, to which power is conveyed from a steam-engine of 65-horse power, by means of a main shaft running the entire length of the building. On the first floor is the engine room, and the heavy machinery for cutting up timber and giving it form and shape. Here all parts of the bodies are sawed and dressed, and framed, leaving only the putting together for hand labor. Three machines are used for turning Spokes, others for turning and mortising Hubs. On the same floor are found the necessary machinery for making all kinds of Bolts used in the construction of carriages and cars.

In an adjoining building, disconnected from the large factories, are fourteen blacksmiths' forges. Here, as in all the other departments, there is a systematic division of labor, and in ironing a carriage it passes through five or six different hands before it is completed. The fires are all kept in full blast by the steam-engine. In this building there is a trip-hammer and furnaces for the manufacture of Springs and Axles.

Another building, 150 feet long, 45 feet wide, and four stories high, stands fronting on Newhall Street. On the first floor is the Private Office and Counting Room, with two rooms of large size devoted to building Horse Cars. This is an entirely new branch of business in New Haven, having never before been attempted by any one. The second floor is divided into different apartments for Trimming purposes, Coloring, and Varnishing. On the third floor there is a large room for cutting out and preparing Trimmings, and above this is a room extending the entire length of the building used wholly for Painting the running parts of carriages.

Mr. Newhall not only makes more of that class of vehicles known as "Buggies," in a year, than any other manufacturer in the United States, but makes more of the constituent parts of a carriage. Nearly every thing belonging to a carriage is made on his own premises. He employs about 176 hands, and previous to the breaking out of the war and the loss of the Southern custom, his average product was about 2,000 Buggies a year.

Having thus noticed at some length one of the oldest and one of the largest of the carriage manufactories in New Haven, we must pass the others in review more rapidly, not because they are less important, but because space cannot be afforded to notice all.

Messrs. D. & L. Wilcoxson are engaged chiefly in making Coaches, Rockaways and Bretts. The senior partner of this firm is now regarded as one of the old coach-makers of the city, having commenced business in 1836, as a partner in the firm of Hooker & Wilcoxson. Subsequently he carried on the manufacture alone, and for many years had a repository in New York. The factory of this firm has a front of sixty feet on Park Street, and extends back over two hundred feet.

Messrs. Miner & Wier have two extensive factories, each almost two hundred feet in length, and well equipped with all the requisite machinery for expeditious work. They manufacture Barouches and Buggies in every variety of styles, including Slide-Seats, Tilburys, Prince Alberts, Drop-Fronts, Side-Springs, etc. They sell largely to dealers in all parts of the country.

Durham & Booth make Rockaways, light Coaches, Bretts, and Buggies. Their factory, located on the corner of Chapel and Hamilton Streets, is new, of brick, and four stories high. It has a front of sixty feet, and extends back 120 feet with an L. Their facilities for manufacturing economically, in point of improved machinery propelled by steam-power, are not surpassed by any. They ordinarily employ about one hundred hands.

Blackman & Rendell are another well-known firm engaged extensively in the manufacture of Coaches, Rockaways, Cabs, and Chariotees. Their factory is built of brick, four stories high, and is 60 by 106 feet, with an L 30 by 40 feet. Both the partners in this firm are practical coach-makers, possessing a thorough knowledge of the business in all its details. They ordinarily employ from 70 to 75 hands.

Wells, Crittenden & Co. are the successors of Killam, Crittenden & Co., who had attained a high reputation in the manufacture of Carriages. They build Coaches, Barouches, etc., and sell largely to dealers in all parts of the United States.

Bogart & Betts make chiefly four and six-seat Rockaways in various styles, light Coaches, and Jersey Wagons. They also make a new style of "Westchester Wagon," which is strong, durable, light, and cheap. This is comparatively a young firm, who, by care in the selection of materials, and fidelity in workmanship, have secured a desirable position in the trade.

Gideon Ferris & Co. have for many years directed their attention chiefly to the manufacture of Rockaways, which they made a specialty, and in which they achieved considerable distinction. For several years they made almost one a day of this class of vehicles, or nearly 400 a year, in a great variety of styles.

Besides these, the list of carriage-makers in New Haven includes the important firms of Hubbell & Morton, F. A. Bradley, George Hoadley & Co., W. & C. Dickerman, Henry Hale & Co., Osborne & Adriance, Scott & Stevens, and others, whose names if known to us we would mention.

There are several important establishments in New Haven employed in making parts of carriages, as wheels, axles, springs, etc.

The **New Haven Wheel Company** (David Wilcoxson, President, and H. G. Lewis, Secretary,) is probably the largest concern in the United States engaged exclusively in the manufacture of Wheels, and their constituent parts. Their machinery is new, much of it invented by themselves or manufactured expressly for their use, and is capable of turning out Wheels, Spokes, Hubs and Felloes with astonishing rapidity and remarkable accuracy. They keep constantly on hand a stock of about a million Spokes finished in the rough. About one-half of all they make is shipped abroad to the Canadas, Mexico, the West Indies and Australia.

L. F. GOODYEAR has an important establishment for the manufacture of Axles. His factory is provided with trip-hammers, lathes, boring machines, and all the requisite machinery for producing Axles in the best manner and at the lowest cost, including some machinery of his own invention, and not in use in other similar manufactories.

Springs are made largely by the "New Haven Spring Company" (G. J. Hine, Secretary) and W. & E. T. Fitch. They use in the manufacture the best-tempered English steel.

Carriage Hardware and Trimmings are made largely by the Plants Manufacturing Company, C. Cowles & Co., H. Galbraith, and others.

Harnesses are made in New Haven to the amount of about a quarter of a million of dollars annually. The manufactory of S. T. CUMMINS is probably the largest in the State with the exception of one in Hartford. Dealers in several of the principal cities obtain their Harnesses from this establishment, and commend both the styles and the quality of the workmanship. By the introduction of sewing-machines in this manufacture, the number of hands formerly required to do a given amount of work has been considerably reduced. Horse Collars are made largely by Gillette & Smith.

The Silver-Plating of Harnesses is a prominent business with the firms of Roberts & Sperry, H. Galbraith, and others. All the Ornamental portions of harnesses and carriages, in close plate, electro plate, and crystal plate, are made by them. Mr. Galbraith also manufactures Cook's Patent Slat Irons, silvered and japanned, and Patent Top Lifters, with handles silvered or japanned.

The New Haven Clock Company are the largest manufacturers of Clocks in the United States. They employ 250 hands, and produce about 150,000 Clocks per annum, many of which are shipped to England, and even to India and China. This Company are the successors of the Jerome Manufacturing Company, originally established by Chauncey Jerome, who is entitled to be called the father of clock-manufacturing in America. So perfect is the system now adopted in this business, and the facilities for manufacturing, that an ordinary O-G Clock Case can be made at a cost for labor of twenty cents, a whole Dial for less than five cents, the Tablets for about four cents, and the entire Movements of a One-Day Brass Clock at a first-cost of less than fifty cents.(1) The Clock manufacture, important as it is, is yet comparatively in its infancy. It is estimated that there are now a half-million Clocks made in this country annually, but it is probable that in twenty years from this time more than a million of clocks will be exported to foreign countries, and all the factories now in existence would not be able to supply the home demand.

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(1) Those who are curious to know how this is done, are referred to the little work on the History of American Clock-Making, written by Chauncey Jerome, and published by F. C. Dayton, Jr., New Haven, 1860. In reference to the process of making the wheels,

There are several important Machine Shops in New Haven, and five or six Foundries of Malleable Iron—one of them, recently erected by a firm from New Britain, quite extensive. Iron Railing is made by the New Haven Iron Railing Company, Building Iron Work by Lagon & Stevens, Machinists' Tools by the New Haven Manufacturing Company and by Milo Peck & Co. The last-named firm are the manufacturers of Peck's Patent Drop Press, which has been elsewhere alluded to in this volume. The first Press made under this patent is now in use in Cowles & Co.'s extensive manufactory of carriage-hardware and stove ornaments. Messrs. Peck & Co. also manufacture power and foot Cutting Presses, and a variety of special and patented articles, some of them of their own invention, as for instance Peck's Patent Atmospheric Forge Hammers.

Among the miscellaneous manufacturing establishments of New Haven there are several that deserve to be mentioned especially, as for instance the Shirt manufactories, at one of which (Winchester & Davies') over one hundred dozen Shirts are made daily; the American Suspender Works; the manufactories of Firearms; the Lock Manufactory of Davenport, Mallory & Co.; the Coach-Lamp Manufactory of Cutler & Hanover; the Spectacle Manufactory of George L. Streeter; the Melodeon Manufactory of Treat & Linsley; the Morocco manufactories of J. Barnett & Son and T. Ensign & Son; the Globe Manufactory of C. D. Candee & Co.; the Silver-Plated Ware Manufactory of J. S. & E. Bromley; and the Paper Mills and Hardware and Cutlery manufactories in Westville.

he says—"It will no doubt astonish a great many to know how rapidly they can be made. I will venture to say that I can pick out three men who will take the brass in the sheet, press out and level under the drop, then cut the teeth and make all of the wheels to five thousand Clocks, in one day. There are from eight to ten of these wheels in every clock, and in an Eight-Day Clock more. This will look to some like a great story, but is one of the wonders of the clock business. If some of the parts of the clock were not made for almost nothing, they could not be sold so cheap when finished."

MANUFACTURES OF BRIDGEPORT.

BRIDGEPORT, as well as New Haven, is largely engaged in the manufacture of Carriages. It also contains the largest manufactory of Sewing Machines in the United States. In 1860, according to the census returns, the city contained ninety-six establishments, having a capital invested of $1,466,400, employing 2,196 males, 1,131 females, yielding a product of $5,622,120. The principal manufactures were the following:

Manufactures.	No. of Establishments.	Capital.	Male hands.	Female hands.	Value of Product.
Beer, porter, etc.	2	$35,000	5		42,000
Boots and shoes	14	37,000	153	29	135,450
Cabinet furniture	4	51,000	130		163,000
Carriages	13	223,600	408	7	604,530
Carriage hardware	1	17,000	35		36,000
Coach lace and trimmings	2	25,000	41	9	55,000
Coffee and spices	1	5,000	3		31,000
Felloes, etc.	1	30,000	8		30,000
Flour, meal, etc	2	5,000	5		39,722
Hoop skirt springs	1	3,000	11	6	46,800
Iron Founding	1	67,000	21		30,000
Lumber (planed)	3	58,000	26		117,900
Machinery	1	44,000	70		65,800
Marble	2	3,300	10		12,250
Patent leather	1	20,000	18		60,000
Saddlery and Harness	4	130,500	254		431,650
Saddle trees	2	7,500	25	3	27,000
Sash, doors and blinds	2	8,000	34		37,350
Sewing machines	1	400,000	550		1,050,000
Shirts	2	38,000	11	1,000	225,000
Shovels	1	2,000	6		20,000
Soap and candles	3	7,000	7		92,000
Springs and axles	2	80,000	147		215,500
Tin and sheet iron	5	14,600	19		64,200
Varnish	1	10,000	1		75,000
Veneers	1	5,000	4		15,000
Wheels	1	18,000	15		31,600
Wire cloth	1	3,000	6		3,000

At Terryville, in Litchfield County, are the important manufactories of the EAGLE LOCK COMPANY, a corporation that had its origin in the consolidation, effected in 1853, of two companies that were the first in the United States to manufacture Cabinet and Trunk Locks by machinery, viz.: the Lewis Lock Company and James Terry Company. The former were the successors of Lewis, McKee & Co., who purchased in 1834 the stock and tools of the first cabinet lock manufactory established at Watertown, Conn., by an English Locksmith in 1832, and removed them to Terryville. The history of this firm is mainly a record of struggles with embarrassments and difficulties. For years after they commenced they had no Engine Lathe, and such a tool was scarcely known in all the manufactories of the State. For a long time they used only hand presses, cutting out the heavy parts with immense labor, though they were the first to introduce the power press, now universally used in manufacturing every variety of hardware. They imported some of their lock-plates already bent-up; for the significant reason, that they could import them cheaper than the raw stock. The want of suitable tools, however, was not their only embarrassment—the want of a market was a still a more serious impediment to success. It is difficult at this day to conceive of the inveterate prejudice that existed only twenty-five years since, against articles of domestic manufacture. Hardware dealers would scarcely look at an American Lock, and scouted the idea that Americans could compete with the English in manufactures. It was only by the most persevering efforts, through commission houses, that any sales at all were effected, and the consequence was that in 1841 the concern was sold to Lewis & Gaylord for six cents on the dollar of the capital stock. The new Company progressed slowly, added new and improved machinery, introduced styles of locks better suited to the market, and put their price so as to meet successfully the English competition.

The history of the early attempts to establish the manufacture of Trunk Locks by James Terry & Co., and their predecessors, Bucknell, McKee & Co., is a record of similar difficulties encountered in the shop and the market; but suffice it to say that they have all been surmounted, and their successors, the Eagle Lock Company, have now three large manufactories, equipped with the best machinery, employing about 200 hands and turn out over 20,000 Locks per day, each furnished with a key ready for use. Recently they purchased the stock and tools of the Fitch Manufacturing Company of New Haven.

This Company now manufacture an immense assortment of Locks. They have issued a list of colored lithographs of several hundred varieties, that are not only a standard article in the stock of dealers in American Hardware, but form a considerable item of export to the West Indies and South America. They also publish in connection with their Price List a historical sketch of their establishment and the manufacture of Cabinet and Trunk Locks in this country—a most laudable plan, which, if generally adopted by manufacturing establishments, would materially lighten the labors of future historians and annalists of American Industry.

MANUFACTURES OF WATERBURY.

WATERBURY, Conn., it is well known, is the chief seat in the United States of the manufacture of Sheet Brass, and Gilt Buttons. The first manufactory of Buttons there, of which we have any account, was one established before 1800 by Henry, Samuel, and Silas Grilley. Their Buttons were made of block tin or pewter and cast iron moulds, the eye being at first of the same material, but afterward wire eyes were employed. The manufacture of Gilt Buttons was commenced about 1802, by Abel Porter and others associated with him. This firm employed eight or nine hands and made Buttons of various forms, convex, concave, and oval—the face only being gilded. Their brass ingot they carried to Bradleyville, in the west part of Litchfield, where it was rolled in an iron mill. The metal was brought back in strips in a very rough state, and pressed between steel rolls two inches in diameter, moved by horse-power, and thus smoothed and finished. All the other work was done by hand. This firm were the founders of the extensive manufactory of the

Scovill Manufacturing Company,

whose history is as follows: In 1816, Abel Porter & Co. disposed of their business to Leavenworth, Hayden & Scovill, who continued it with moderate success for sixteen years, until the fall of 1827, when Dr. Leavenworth and Mr. Hayden sold out their interest to William H. Scovill, and the firm became J. M. L. & W. H. Scovill. Two years subsequently this new firm met with a severe loss in the destruction of their factory by fire, but it was soon rebuilt and the business was prosecuted with much energy and marked success.

In 1840, Mr. S. M. Buckingham and Abram Ives became interested in the button business, which was now carried on under the name of Scovill & Co., while J. M. L. & W. H. Scovill continued the manufacture of Rolled and Plated Metal, which had then become an important interest. They also associated with themselves John Buckingham, under the name of Scovill & Buckingham, in the making of Brass Butts, the business being carried on at the place now owned by the Oakville Pin Company on Steel's Brook.

In January, 1850, a joint stock company was formed under the name of the Scovill Manufacturing Company, into which all the interests named above were merged, and some of the employees were admitted as stockholders. The capital was at first $250,000, but subsequently increased to $300,000.

This company has for many years been the principal manufacturer of Daguerreotype Plates in this country, a business which was commenced about the year 1842. These were made of British copper, which being more perfectly refined and possessing a more even fibre is preferable to American copper, where evenness of surface is indispensable. The plates are prepared by the rolling process, the silver being plated upon the copper in the course of the operation, and then is afterwards cut into the various sizes required. The "mats" or ornamental mountings, usually fitted into the cases for keeping in the pictures, are engraved and chased for the most part by machinery, and by an ingenious adaptation of eccentric movements the "sight" of the metal frame is connected to the true circle, oval or oblong, with turned corners in the same operation by which the chasing is performed. The manufacture of these plates and mattings was for many years a very extensive branch of this Company's business, but since the introduction of photographs there has been a marked decline in the demand for Daguerreotype Plates, though the quantity produced at this manufactory is still large.

Buttons are now made very extensively by the Scovill Company (their establishment having a capacity for producing 1500 gross per day), and chiefly by machines invented and constructed upon their premises. One machine for punching out the blanks for spherical buttons and raising them to the required convexity in one operation, does its work at the rate of 280 buttons per minute; whilst another machine, fitted with punches, strikes out 1800 plain blanks in the same space of time. An ingenious machine is also employed for "milling" the eyes of the ordinary plain gilt buttons, and does the work of ten or twelve girls. The military Buttons made at the establishment, as also the general range of ornamental articles of the same class, are in better taste, it has been conceded by competent judges, than the generality of the same goods produced in England.

This Company now occupy extensive and commodious buildings, and are manufacturing Sheet Brass, German Silver, Plated Metal, Brass and Silver-Plated Hinges, Military Buttons, Daguerreotype Plates, Kerosene Burners, Brass and German Silver Thimbles, and numerous miscellaneous articles in brass, including a novel and highly ornate style of Metal Boxes for druggists' and chemists' use.

About 400 persons are furnished employment in their manufactory.

The Benedict & Burnham Manufacturing Company.

Forty years ago, in 1823, Mr. Aaron Benedict and Bennet Bronson of Waterbury, and Nathan Smith, William Bristol, and David C. De Forest of New Haven, formed a partnership under the style of "A. Benedict," for the manufacture of Gilt Buttons. The capital was $6,500. This firm was succeeded in 1829 by another, under the name of "Benedict & Coe," with a capital of $20,000. On the 10th of February, 1834, the copartnership expired and another was formed with a capital of $40,000, under the name of Benedict & Burnham, the partners being Aaron Benedict, Gordon W. Burnham, Bennet Bronson, Alfred Platt, Henry Bronson, Samuel S. De Forest, and John De Forest. The two first were the managing partners and agents of the firm, Mr. Benedict having charge of the business at home, which was prosecuted with great energy and success, and carried through the financial crisis of 1837 and 1839 without dishonor or serious loss. The copartnership was renewed in 1838 with a capital of $71,000, and again in March, 1840, with a capital of $100,000.

On the 15th of January, 1842, the firm of Benedict & Burnham gave place to the "Benedict & Burnham Manufacturing Company," a joint stock corporation, and the first, we believe, established in the town. The capital was $100,000, and Mr. Benedict chosen President, which office he has held ever since. In 1848 the capital was increased to $200,000, and in 1856 to $400,000. This Company has from time to time became the parent of several joint stock companies, as for instance, the American Pin Company, Waterbury Button Company, and Waterbury Clock Company. Whenever a branch of its business could be better carried on separately, the property necessary for its prosecution was detached and distributed as a dividend to its stockholders in the shape of stock in a new company.

At an early period this Company engaged in the manufacture of German Silver, and they now probably make greater quantities of it than any other establishment in the country.

Besides Sheet Brass and German Silver, this Company manufactures Brass and Copper Wire, Brass and Copper Tubing, Copper Rivets and Burrs, and a variety of miscellaneous manufactures in Brass, such as Spurs, Fender or Grate Ornaments, and Army Belt Buckles and Plates, which are made here in vast numbers.

The City Manufacturing Company occupy a part of the buildings of the Benedict & Burnham Company for the manufacture of Button Backs, Kerosene Lamp Work, etc. They have a machine that produces Button Backs at the rate of nearly 200 a minute.

Waterbury Brass Company.

This Company was more recently organized than either of the two just mentioned, and probably sells a larger proportion of its manufactures in the form of Sheet Brass. They, however, are also extensively engaged in Wire Drawing and making Brass Kettles and Pans of a novel and excellent character.

Wire, like almost every thing else in Waterbury, is made by machinery. The ingot, which is a brass piece about eighty inches in length, by four inches in width, and 1¼ inches in thickness, is rolled into long ribbons and then brought to a slitting machine for the purpose of being divided into a number of long square bars or rods. These rods are taken to another machine, where the rough edges are slightly rounded and the ends tapered, and then they are passed forcibly through an aperture of a specified size which does not round the rod by removing its edges by abrasion, but condenses the metal into itself and increases its length; it also becomes so hard that it has to be annealed or it would break. For different sizes of wire the dies are of course proportionately lessened, and any degree of tenacity can be obtained by skillful workmen, even down to a filament of brass or copper as fine as a spider's web.

The process of making Kettles as practised in this Company's establishment, is still more curious. Instead of casting them as is frequently done in England, the article is "spun" up from a flat plate by powerful machinery constructed for the purpose. The blank is put into an ordinary engine lathe running at high speed. The face plate of the lathe has a cast iron cone or *fac simile* of a kettle secured to it, and the blank having been previously partially formed up in a shape somewhat like the finished kettle is now rapidly rotated. There is a small steel roller placed in close contiguity, which runs along the surface of the blank and draws it up or spins it out to the shape of a cone; thus the kettle is formed, and it only remains to wire the top and bail it to complete the article. Kettles holding twenty and thirty gallons are made in this manner, as well as the smaller sizes. Locomotive Head-Lights and Lighthouse Reflectors are made by the same machinery. The officers of the Waterbury Brass Company are—JOHN P. ELTON, President; C. H. CARTER, Treasurer; and J. S. ELTON, Secretary.

The other principal companies or firms in Waterbury engaged in the manufacture of Sheet Brass and Wire Drawing, are BROWN & BROTHERS, and HOLMES, BOOTH & HAYDENS.

No city in the Union, certainly none of equal population, contains so great a variety of ingenious and labor-saving machinery as Waterbury. The American Pin Company have machines that turn out 1200 packs of solid headed pins per day, each pack containing 255 dozens of pins. No description of them can be given, as the process of papering is all that is permitted to be seen. The pins are all prepared by machinery; they are placed in an inclined feeding dish, from which they fall into a trough having a slit sufficiently wide to admit the shank of a pin and yet suspend it by its head. The descending line of suspended pins is conducted by the slit to a sliding frame carrying a dozen grooves, in each of which a pin is deposited as it passes under the slit; the pins are thus arranged in a row, with their points all turned the same way. The sheet of paper for receiving them is placed by the attendant on a grooved table, and deep folds are pressed into it at equal distances, and into the cross ridges thus formed a row of pins is pushed by the carrying-frame at every thrust forward.

Messrs. Blake & Johnson have a machine of their own invention and construction that makes Ladies' Hair Pins at the rate of 180 per minute. A coil of wire is placed upon a drum or cylinder which is suspended from the ceiling, and the point being inserted on to the machine, it does all the work and requires no immediate superintendence until the whole quantity of wire is exhausted.

The American Flask and Cap Company have machinery for filling Percussion Caps with fulminating Powder and also an arrangement for counting caps that is somewhat peculiar. A little girl holds in her hand a perforated tin plate, which she thrusts in the heap of caps before her, each hole being just large enough to admit a single cap, and slight sifting motion causes the apertures to be filled. There are one hundred holes in a plate, and consequently when the plate is full the exact number is known. There is also a false bottom to the counter, which being pulled out allows the caps to fall into a long trough, from which they are easily slid into the paper boxes. About one hundred tons of copper are annually converted into Percussion Caps in this establishment.

The Waterbury Clock Company is one of the five large companies engaged in manufacturing Clocks in the United States. At their manufactory is also made the walking Dolls or "brazen young ladies"—a toy which has attracted a vast deal of attention in the leading cities.

Charles J. Taylor has an establishment for making Drawers, Undershirts, and Merino Wool knitted articles. The American Suspender Co. is probably the largest manufacturer of Elastic Webbings in the United States. Besides these Companies there are in Waterbury the Mattatuck Manufacturing Company, which makes Lamp Tubes, Thimbles, Umbrella and Parasol furniture; the Waterbury Hook and Eye Company;

the Waterbury Button Company; the Lane Manufacturing Company, which makes Buttons; Oakville Company, solid headed Pins; Hitchcock & Castle, Buttons and Hooks and Eyes; American Ring Co.; E. Robinson & Son, cloth Buttons; Waterbury Buckle Co.; Waterbury Gas Light Co.; Maltby, Morton & Co., manufacturers of Ivory and Steel carriage Trimmings, fine Pearl, Vest, and Ladies' Dress Buttons; Charles W. Johnson, manufacturer of Machinery; H. A. Mathews, Carriage and Harness Trimmings; the Farrel Foundry and Machine Company; the City Manufacturing Company, which makes patent Lamp Tops and Tubes; Steel & Johnson, Manufacturing Company, Metal Buttons and Jewelry; D. B. Hurd, Button Eyes, Backs, and Staples; and the Waterville Knife Company, manufacturers of Pocket Cutlery.

MANUFACTURES OF MIDDLETOWN, CONN.

MIDDLETOWN, situated on the west bank of the Connecticut River, fourteen miles south from Hartford, has several important manufactories, especially of Firearms, Gum Elastic Suspenders, Hardware, Pumps and other hydraulic machines.

The manufacture of Firearms is carried on by the Alsop's & Savage Firearms Manufacturing Companies, gun-locks by Ira A. Johnson, gun-barrels by Peter H. Ashton, and cartridges by De Witt Sage. All these shops are now busily employed.

The first manufactory of Gum Elastic Suspenders established in the United States, was, we believe, that of the Russel Manufacturing Company at Middletown. This Company has now five mills, and makes Suspenders, Patent Solid Belting, Patent Cord Clothing, Girth, Roller Rein, and Boot Webs, to the amount of $300,000. George H. Hurlbut is Treasurer of the Company. Suspender Twist, Thread and Yarn, are made by the Falls Manufacturing Company, of which S. G. Hurlbut is Treasurer.

Machinery and various articles in metals are, as is usual in Connecticut, made at several establishments. The two principal machine shops are those of William Stroud and the Sanseer Manufacturing Company (C. F. Browning, Treas.), who also manufacture Cast Iron Bolts; Locks are made by William Wilcox & Co.; Grommets, Thimbles, and Clews by J. K. Penfield & Son; and Patent Iron Grommets and Galvanized Iron Clews and Thimbles, by Wilcox & Hall. Blind Fastenings and

Saw Stretchers are made by Horace Van Sands; Washing Machines by the Washing Machine Company; Clothes Wringers by the Metropolitan Company (W. M. Terrell, Treasurer); Sewing Machines by the Middletown Manufacturing Company (J. Hotchkiss, Treasurer); and Try-squares, bevels, etc., by J. Tidgewell & Son and Steel yards by Hibbart Smith, Jr. There is also an important manufactory of Britannia ware (F. W. & O. Z. Peltor); of Hoop Skirts and Corset Braces (Ferdinand A. Hart); of Paper Boxes and Hoop Skirt Trimmings (Henry S. White); of Body Braces and Trusses (J. Danforth); of Patent Rein Snaps and Snap Hoops (J. R. Henshaw & Co.); of Doors, Blinds, Sash and Patent Well Curbs (Hubbard, Bros.); of Soap and Candles (Allison, Bros.); of Carriages (Cornwell & Warner); and of Japanned Ware, of which J. O. Smith is proprietor.

But probably the manufactory, which of all others in Middletown is most widely known in this country and abroad, is that of the W. & B. DOUGLAS MANUFACTURING COMPANY. This concern was founded in 1832 by William Douglas and W. H. Guild, who then commenced business as machinists and manufacturers of small engines, but it dates its celebrity from 1842, when the brothers, William and Benjamin Douglas, having invented a novel Revolving Stand Pump, determined to make its manufacture a specialty, and for the purpose of introducing it traveled with a pump under each arm from store to store. At that time an iron or metallic pump was scarcely known, and it required the most persevering efforts to convince the public, then less disposed than now to encourage novelties, of their value. These men, however, who were grandsons of Col. Wm. Douglas, of Revolutionary fame, and descendants of the renowned Douglas of Scotland, whose motto, "jamais arriere" (never behind), they still maintain, came of stock that were not to be dismayed by difficulties, and, though their sales in the first year of their enterprise did not amount to three hundred pumps, they persevered until now the Douglas pump is a standard article in the stock of almost every dealer in American Hardware.

In 1858, the elder brother, William Douglas, died, and a new Company, incorporated by a special charter granted by the Legislature of Connecticut, was formed, under the name of W. & B. Douglas, of which Benjamin Douglas is President. Besides a great variety of Pumps, they manufacture Hydraulic Rams and Garden Engines, in which they have made important improvements, and also Wrought Iron Butts and Hinges. Their sales now of Hydraulic machines alone amount to about $250,000 annually, and their market includes not only this country, but the Canadas, South America, the West Indies, Australia, and Europe, Asia, and nearly every portion of the civilized world.

MANUFACTURES OF NORWICH.

NORWICH, situated in New London County, at the head of navigation on the Thames River, formed by the confluence of the Yantic and Shetucket, had in 1860, according to the Census Returns, 146 manufacturing establishments, with an aggregate capital of $2,498,300, employing 1,674 male and 1,398 female hands, yielding products valued at $4,686,972. About one-fourth of this amount was in Denims, Ticks and Stripes, made principally at the factories of the Falls Company and the Shetucket Company—each of which has a capital of $500,000—William P. Greene being President, and Gardner Greene, Secretary, of both companies. At five woolen mills, Flannels, Cassimeres and Worsted goods were made to the amount of $744,800, while Hosiery was made at one manufactory to the amount of $75,000. The Norwich Bleaching and Callendering Company employed 52 men and 12 women, and produced a value of $150,000. Paper has long been a prominent article in the manufacture of this place. The first paper manufactured in Connecticut was made in Greenville, now a part of Norwich, where are now the extensive mills of the Chelsea Manufacturing Company (E. G. Bartow, President, and T. Bartow, Secretary), which has a capital of $200,000 employed in making Printing Paper.

The manufactures of Iron are also important. Machinery and Castings were made at seven establishments to the amount of $535,000, including Springs, Axles, and Paper Machinery made by Samuel Mowrey to the amount of $60,000, and including Auger Bits made by Charles B. Converse & Co. The Sterry Faucet Company manufactured Faucets, Cocks and Valves, to the amount of $30,000. There are also two manufactories of Firearms—the Bacon Manufacturing Company (John W. Stedman, President, D. P. Coon, Treasurer), and the Norwich Arms Company (A. H. Almy, President, and W. H. Tingley, Treasurer). The latter company have now one of the largest private Armories in the United States. They are manufacturing about 1200 Muskets, 3,000 Bayonets, and 2,000 Locks, besides Rifles and Carbines, per week. They are sole manufacturers of a new breech-loading Rifle invented by Armstrong & Taylor, of Augusta, Kentucky, which is said to be a very superior and effective weapon.

Probably no firm in Norwich has done as much to make the town known abroad as Richardson & Co., manufacturers of Dr. Sweet's Liniment. This physician was most remarkable for his skill as a bone-setter, and a preparation made in accordance with his prescription has been advertised by this firm wherever newspapers are printed.

The miscellaneous manufactures of Norwich include Confectionery, Carriages, Harness, Sash, Doors and Blinds, Case's Morocco Manufactory, Crocker's Cork Factory, Turner & Co.'s Cordage Works, and the Wood Type Manufactory of William H. Page & Co., whose wood letter is in great demand not only by the printers of the United States but of Continental Europe.

NEW LONDON, the other county town of New London County, has a few manufactories of importance, and as the people are active and enterprising, it is probable that the next decade will witness a considerable addition to their number. The principal manufactories are those of the Wilson Manufacturing Company, who make Hardware and Brass Castings; the Iron Foundries and Boiler Shops of the Albertson & Douglas Machine Co. and New London Manufacturing Co.; the Paper Mills of O. Woodworth and Robinson & Bingham; the Piano Manufactory of T. M. Allyn & Co.; and the New London Horse-Nail Co. (J. C. Tate, President). Besides these, Jewelry is made by William Butler, David Liscomb, and Leonard S. Brown; Melodeons by Nathan D. Smith; Pumps and Blocks by Barnes & Crocker and Charles H. Whittemore; Carriages by William F. Reables and John N. Brown; and Harnesses by W. B. Lewis.

In no State in the Union is the manufacture of the lighter articles in metal so extensively carried on as in Connecticut. Almost every village, especially in the valleys of the Naugatuck and Housatonic, is the seat of several manufactories, where both skilled handicraft and highly ingenious machinery are employed for the production of articles of utility in iron, brass, or copper. Each village, too, is generally distinguished for the prominence of some particular manufacture. Bristol is noted for its manufactories of Clocks and Clock Trimmings; Waterbury and Ansonia for their Brass manufactures; East Hampton for its Bells; New Britain and Meriden for Hardware; Winsted for its Scythes; Birmingham for its Hoop Skirts; Danbury for Hats; and in these, and the more prominent manufacturing centres that we have mentioned, are produced articles that it would require a volume to enumerate, and which for cheapness and ingenious workmanship are the Wonder of the World.

MANUFACTURES OF MANCHESTER, N. H.

MANCHESTER, situated on the Merrimack river, 58 miles from Boston, is the largest manufacturing town in New Hampshire. In 1860, according to the census returns, it had 178 manufactories, with an aggregate capital of $8,327,695, employing 3104 male, and 5024 female hands, and produced a value of $10,665,296. Fully three-fourths of this amount was in cotton and mixed goods, made by four Companies, which had an aggregate capital of $6,300,000.

Manchester, like Lawrence and Lowell, is a magnificent specimen of the enterprise and skill of the New England people. Thirty-five years ago the place upon which the city is built was occupied by a few farmers, there being nothing more than a small village at Amoskeag Falls. It is now a municipality, with a population of 25,000, which is rapidly increasing. Its prosperity is due largely to the proprietors of the AMOSKEAG MANUFACTURING COMPANY, who owned originally, 26,000 acres, lying on both sides of the river; and who, instead of attempting a great speculation, disposed of the land on very favorable terms, and encouraged manufacturing enterprises. This Company was incorporated in July, 1831, and commenced operations in 1839. Its capital was originally $1,000,000, but has since been increased to $3,000,000. Its business comprises the selling of lands, letting water-power, and manufacturing cotton goods and machinery, including locomotives. In all these enterprises, the Company has been remarkably successful; and during the last two years it declared annual dividends of 40 per cent. upon its capital stock. When in full operation, this Company gives employment to over 3000 persons.

The "Stark Mills" is another large corporation in Manchester, and commenced operations in 1839, with an authorized capital of $1,250,000. This Company has two mills employed in making ducks, denims, sheetings and canton flannels, and seamless grain-bags—a novel and important article of trade. These bags are 45 inches long, and are manufactured of various qualities and weight. The warp is a double one; and, by the construction of the loom, the "filling," or weft, traverses both sides, uniting the warps at the edge, instead of producing a selvage. The loom—the invention of Cyrus W. Baldwin—is a perfect self-actor or automaton. It commences the bag, goes on until the requisite number of picks has been thrown in, to make up the length; it then closes the bottom, throws in a given number of picks as a *tab*, and then commences another bag. All that the weaver has to do is to attend, in the usual way, to the perfect working of the machine, and cut out each bag, as from their thickness, any quantity accumulated on a cloth-beam would be an encumbrance to the machine. As the bags are cut out, the weaver folds and piles them by the side of the loom, and these are removed, and an account taken every half-day. The bags are hemmed round the top, or mouth, by sewing-machines, each machine being attended by one female operative; and the average work of each is 650 bags for a machine per day. There are 126 of these seamless bag-looms at work in the Stark Mills. The average make is 47 bags for a loom per day, and the speed about 130 picks per minute.

The "Manchester Print Works," incorporated in 1839, has a capital of $1,800,000, employs 1500 operatives, and produces about 15,000,000 yards of delaines, bareges, and calicoes, annually. The Printery is a fire-proof structure, built of brick, in the form of a hollow square, 165 by 200 feet. This Company has been among the foremost in adopting devices calculated to save labor. A cotton piece in this establishment is scarcely touched by hand, from the time it enters the machine until it is dyed, and has to be untwisted from the wringing, after dyeing. The engraving of the rollers, instead of being performed by the old, tedious hand-process, is executed by the ingenious Pentograph machine, invented by John Hope, of Providence, and which has been previously described. The singeing of the cloth, instead of being accomplished as formerly, by being drawn over red-hot cylinders, is now effected by an ingenious machine, which supplies gas for the burning material. The fabric is passed rapidly over a horizontal pipe, along which numerous little apertures extend in a straight line, so that the gas, ignited, gives a long line of flame, equal to the width of the cloth. The movement is at the rate of about three feet in a second, and the loose fibres are burned off without igniting the fabric. The stopping of the motion cuts off the gas beneath the cloth, and of course extinguishes the flame, which is immediately relighted as soon as the movement again commences, by means of side lights—the extinguishing and relighting being effected by the action of the machinery itself, without any additional manipulations of the workmen. Any sparks that may remain are extinguished, as the cloth immediately passes between two rubbers placed in front of the line of flame.

The other important corporations in Manchester, are the Amoskeag Duck and Bag Company, which has a capital of $300,000, and manufactures 600,000 bags per annum; the Amoskeag Paper-mill, which produces about one and a quarter tons of book and news paper per day; the Amoskeag Axe Company, which employs 50 hands, and makes about 800 tools per day; the Langdon Manufacturing Company, capital $225,000; the Manchester Iron Works, and the Manchester Locomotive Works, which were incorporated in 1854, with a capital of $100,000, and have been very successful.

MANUFACTURES OF NASHUA, N. H.

NASHUA, in Hillsboro' County, at the confluence of the Nashua and Merrimac rivers, about forty miles from Boston, is the second most important manufacturing town in New Hampshire. It has a capital of over two million dollars invested in manufactures, employs about 2800 hands, and produces an annual value of nearly $4,000,000. About twenty million yards of cotton goods were made in 1860 by three corporations, the Nashua, Jackson, and Harbor Manufacturing Companies, whose aggregate capital was $1,660,000, and who employed 1500 operatives. The oldest and largest of these companies is the Nashua, which has 4 mills, having 40,000 spindles and 1200 looms, and also an extensive machine-shop. The Jackson has 3 mills, with 22,000 spindles and 700 looms.

Next to Cotton goods, the most prominent manufactories are those of Iron and the various fabrics of Iron. Of these the most important are the works of the NASHUA IRON COMPANY, which manufactures every description of forged work, including forged iron locomotive driving-wheels, locomotive tires, piston and connecting rods, frames, crank, straight and car axles, locomotive cranks, etc. The works comprise two forge shops, one with four steam trip hammers, and one with three steam hammers, a rolling-mill, and a machine-shop. In equipments and general facilities, these works are not surpassed by any similar ones in the country.

The Nashua Iron Company was organized in 1848, and its present capital is $125,000, though the Company have the privilege of increasing it to $300,000. All the extensive additions that have been made to the works and machinery within a few years, were paid for out of the profits of the Company, which had been set aside as a reserved fund, after paying the usual dividend. About 180 men are now employed in the works, and the average annual product is $500,000. Moses A. Herrick, Esq., of Boston, is Treasurer of this well-managed and successful Company.

Machinists' Tools and Steam Engines are made quite extensively by the firm of GAGE, WARNER & WHITNEY. The senior partner of this firm established in 1837 what is believed to have been the first shop in the United States devoted exclusively to the manufacture of machinists' tools. The present co-partnership of John H. Gage, David A. G. Warner, and George Whitney, dates from December, 1851. Their manufactures include iron planers of all sizes, engine lathes, from the smallest watchmaker's up to a size suitable for turning locomotive driving-wheels six or eight feet in diameter, hand lathes of all sizes, chucking lathes of all dimensions, with sliding bed, bolt-cutting machines for rapidly transforming any part of a plain bolt into a nice evenly-threaded screw, upright and swing drills, boring machines for shaping the interior of steam cylinders or other bores of large diameter, slabbers of all kinds, gear-cutting engines of all sizes for shaping and smoothing the teeth of gear wheels with perfect accuracy, power punching-machines of various sizes, &c. Since 1852 Messrs. Gage, Warner & Whitney have also been manufacturers of Steam Engines. The first steam engine built by them is now employed in driving their own machinery, and as a specimen of workmanship is highly creditable to its builders.

Nashua has also a very important manufactory of locks and house trimmings, known as the NASHUA LOCK COMPANY. This company is the successor of Col. L. W. Noyes, who commenced business in 1837, and was one of the first in the country to engage extensively in the manufacture of locks. When this company was organized American locks were scarcely recognised as articles of hardware, but by improvements in machinery, and facilities for manufacturing, the price has been gradually reduced, until imported locks are almost excluded from the American market. Every description of mortise and rim locks, mortise and rim latches, and every variety of knobs and house trimmings, are now made by this Company, and sold at their warehouse in Boston. The works comprise an iron and brass foundry, where castings are made for sale, as well as for consumption in their other manufactures. This Company make locks that range in price from 50 cents to $60 per dozen.

In 1859 Mr. Franklin O. Munroe purchased the interests of his associates in the Nashua Lock Company, and he is now, we believe, sole proprietor.

The Underhill Edge Tool Company have also an important establishment in Nashua for making tools of all kinds.

Besides these, Gage, Murray & Gilman have an extensive manufactory of cards and fancy papers, Eaton & Ayer, of bobbins and shuttles, George W. Johnson, of fliers and spindles, F. S. Rogers & Son, of palm-leaf hats, Chase & Baldwin and Alonzo Taylor, of sewing machines, Lewis Kimball, of bedsteads, Holt & Jones, of mattresses, etc., J. & P. Mullen, of carpets, George A. Rollins & Co., of machinery, and S. S. Davis and Scott & Noyes, of soap and candles. Confectionery is made to a considerable amount by J. C. Kempton, John Webster, C. Goldthwait, and Charles Holman; iron castings at the foundries of Charles Williams and J. D. Otterson; flour and meal by Sargent & Cross and Eaton & Ayer; sash, doors and blinds by George E. Wilder; bird-cages by Fletcher & Webster; patent money-drawers by A. O. Miles; and hop yeast by M. & K. F. Worcester and S. P. Dean.

MANUFACTURES OF CONCORD.

CONCORD, the capital of the State of New Hampshire, is distinguished principally as an industrial centre, for its manufactories of carriages and wagons. In 1860 there was a capital invested in this manufacture of $294,000, employing 311 men, whose production for that year was $359,945. It is probable that the annual average product is considerably more than this. The firms engaged in the business in 1860 were J. S. & E. A. Abbott,[1] Lewis Downing & Sons, J. T. Blodgett, James Butters, Benjamin Coffin, William Crockett, Samuel M. Griffin, and David Pearson, and Warde & Humphrey, whose shops were at Fisherville.

The Iron and Stove foundries of J. D. Cooper & Co., and W. P. & T. H. Ford, employed 53 men, and produced a value of $115,400. The Messrs. Ford, proprietors of the "Concord Iron Foundry," also manufacture ploughs, harrows, cultivators, and other agricultural implements. Among the special articles made by them are Harrow and Cultivator Teeth, so formed that they can be chilled, which peculiarly adapts them for sward land; and, as many practical farmers have certified, they pulverize the soil more effectually than any other implement of husbandry in use.

Melodeons and Seraphines are made by the firms of Prescott Brothers, and Liscom, Dearborn & Co. The church Seraphines made here, with double reeds, costing from $125 to $150, are especially suitable for small churches. The firm of Liscom, Dearborn & Co. also manufacture Piano Fortes, and have attained more than a local reputation in this branch.

Boots and shoes are made by nine firms to the amount of $110,000, and Lasts by J. L. Jackson to the amount of $10,000. Men's half-hose are made by B. F. & D. Holden, and worsted goods by T. H. Brown. These firms in 1860 employed 53 hands, and manufactured to the amount of $77,900. Concord has also manufactories of Brooms, Carriage Springs, Gloves, Palm Leaf Hats, Essential Oils, Ground Plaster, Soap and Candles, Spokes and Hubs, and several saw and planing mills. In West

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(1) The works and lumber-yards of the Messrs. ABBOTT occupy about four acres of ground. They commenced business in Concord in 1828, and since then have built every description of vehicle from a wheelbarrow to a coach, including express wagons, circus wagons, stage coaches, monkey and lion cages for peripatetic menageries. They recently built four leviathan coaches for Australia, six feet four inches between the wheels, designed to carry thirty-two passengers, and a large number of mail-wagons for the Pacific Mail Company and the Overland Mail Transportation Company. About one-fourth of all the wagons they make are exported to the Canadas, Mexico, South America, Australia, and Europe.

Concord Henry Dunklee employed 10 hands in the manufacture of Sewing and Embroidery silks.

Fisherville, generally regarded as a part of Concord, though situated six miles north of the main village, contains a number of important manufactories. Here is the cotton mill of H. H. & J. S. BROWN, who in 1860 employed 65 males and 110 females, run 11,500 spindles and 304 looms, and produced 2,750,000 yards of print cloths. As a general rule, the manufacturers of Textile fabrics are not so much distinguished for general intelligence and enterprise as the workers in metals; but this firm is an exception to the rule.

In Fisherville also is the saw manufactory of GAGE, PORTER & Co., one of the most important of its class in the country. This firm import their steel direct from England, and have adopted several improvements in grinding and tempering their saws, the important process of tempering being personally superintended by the senior partner, Mr. Gage. They manufacture every description of cast-steel saws ordinarily used, including circular, mill, cross-cut, and wood-saws, and each is accompanied with a liberal warranty, and if defective, can be returned. The firm has been established since 1849, and in fifteen years has attained a reputation that older firms may envy. We believe this is the only firm engaged in the manufacture of saws in the State of New Hampshire.

Piano Forte Hardware is made by the firms of J. B. Rand and Wilson & Blake, who employ 20 hands. Mr. Rand is also a manufacturer of Piano Fortes, and is proprietor of Huntoon's patent machine for cutting Serpentine Fluted work. Piano Forte and Seraphine legs, bedstead posts, balusters, etc., can be carved or fluted by means of this remarkable machine with as much facility as wood is turned in an ordinary turning-lathe.

Furniture is made in Fisherville to the amount of over $80,000 annually by the two firms of Caldwell, Amsden & Co., and William Robinson, who employ 120 hands.

The aggregate value of the articles annually manufactured in Concord amounts to about two millions of dollars.

MANUFACTURES OF VERMONT.

VERMONT is more exclusively agricultural than any of the other Northern States. In 1850 the persons engaged in agricultural pursuits exceeded those employed in manufactures in the proportion of nearly six to one. In 1860, according to the census returns, there were in the State 1501 manufacturing establishments, producing more than $500 a year, which had a capital invested of $9,500,000, employed 8940 male, and 1860 female hands, and yielded products valued at $16,000,000. The census-takers in this State appear, however, to have been more negligent in the performance of their duties than usual, for, including carpenters, builders, and blacksmiths, which are enumerated in other places, we have before us a list of the names of over 3000 individuals and firms engaged in manufacturing pursuits in Vermont in 1860, and it would be preposterous to assume, though the factories are generally small, that as many as one-half of them made less than $500 per year. Of these establishments, about 1500 were engaged in the various manufactures of wood, there being in the State over 600 saw, clapboard, and shingle-mills; 50 manufacturers of wash-boards, butter firkins, clothes-pins, pails, wooden bowls, etc.; 250 carriage and sleigh manufacturers; 150 cabinet-makers; 50 chair and 75 bedstead manufacturers; 26 pill, cheese, and packing-box factories; 50 manufacturers of agricultural implements; 80 of doors, sash, and blinds; 4 of axe-helves; and 13 of broom, fork, hoe, and scythe-handles. There were in the State over 400 boot and shoe shops, and 160 tanning and currying shops, about 50 iron foundries, 75 machine shops, 1 car, and 1 car-wheel manufactory. The number of grist and flouring mills exceeded 300. There were also 17 paper mills, 5 paint, 4 linseed-oil, and 2 yellow-ochre manufactories. About 20 firms are engaged in the quarrying and working marble at Rutland, Dorset, and Brandon; and slate is quarried at Castleton, Fairhaven, Guilford, and other places, by about the same number of individuals and firms, including some important incorporated companies. There were in the State, in 1860, 8 cotton mills, which employed 157 male, and 222 female hands, and produced print cloths, wadding, batting, etc., of the value of $357,450; and 51 woollen mills, having 23,371 spindles, 463 looms, employed 901 male and 1178 female hands, and produced a value of $2,961,137.

Within the last few years there has been considerable increase in the development of the natural resources of the State, especially marble, slate, iron, and porcelain; but there is yet a very remarkable deficiency in extensive establishments. With the exception of the Brandon Iron and

Car-wheel Works, we know of but one establishment in all the State that, for extent, celebrity, and national importance, can be fairly called remarkable, or having a history worth relating, and that is the Platform Scale Manufactory of

E. & T. Fairbanks & Co., St. Johnsbury, Vermont.

Previous to 1830, platform scales, though not entirely unknown, were very little used. Transactions by weight were confined to the even balance, the Dearborn balance, and the Roman steelyard. The introduction of platform scales has wrought a revolution in almost every department of business where measurement of quantities is required, whether relating to the sale or exchange of commodities, or the transportation of heavy bodies; so that this instrument, of comparatively modern invention, is now as indispensable in the various transactions of business, as the railroad car or the canal boat. In the year 1830 and 1831, Mr. Thaddeus Fairbanks invented important improvements in platform scales, which were patented, and the manufacture was commenced by Messrs. E. and T. Fairbanks & Co. The most essential improvements claimed by Mr. Fairbanks were the employment of *two levers* only in the construction of the scale, being the most simple combination in a compound scale, and the use of *knife edge bearings*, resting upon plain polished steel surfaces.

The first manufactures of the Company were confined to hay scales, but additional improvements were from time to time made, and new modifications adopted, with reference to the wants and conveniences of the commercial, manufacturing, and agricultural community. Their operations were for several years limited in amount, and the introduction of platform scales was slow, until the public had time to become assured of their accuracy, and by experimental trials learn their great utility. As public confidence was secured, and the utility of the instrument was more and more demonstrated, a demand was created which has rendered it necessary to increase the manufacture of scales, until at the present time the establishment of the Messrs. Fairbanks employs a force of about three hundred mechanics solely in the manufacture of scales, and their annual production is about $500,000. About 150,000 scales have been made by the firm, including a number of weigh-lock scales, having a capacity of from 200 to 250 tons.

The general management of the business of the Company being assumed by the other partners, Mr. Thaddeus Fairbanks, who is a practical inventor and machinist, has from the first devoted his time and attention to the science of weighing as applied to the compound balance, and to perfecting the various modifications of scales, until at the present time more than one hundred different modifications have been introduced, adapted to all the various departments of business in the civilized world.

The works at which these scales are made are composed of about 20 structures of wood or brick, of all periods of erection and of all sizes, and are less noteworthy than the system employed to secure reliable work. The theory of individual responsibility is so fully carried out, that the name or initials of the sealer is stamped on the working parts of each scale, large or small, and thus any derangement or inaccuracy subsequently discovered recurs directly to the workmen, who are frequently so anxious to maintain their reputation, that they go long journeys at their own expense for the purpose of investigating or correcting alleged imperfections.

For the manufacture of the smaller varieties, such as druggists' scales, weighing single drachms, the firm have a manufactory in the city of New York. Fairbanks' scales are now extensively used in foreign countries, and it is no exaggeration to say, that they have done more than all other agencies combined to equalize the weight of commodities in commercial transactions.

STATISTICS OF COTTON MANUFACTURES IN NEW ENGLAND FOR THE YEAR ENDING JUNE 1st, 1860.

(Prepared at Census Office expressly for this work, and never before published.)

	Maine.	New Ham'shire.	Ver-mont.	Massa-chusetts.	Rhode Island.	Connecti-cut.	Total in N.E.States.	Total in Unit'dStates
No Establishments,	19	44	8	217	153	129	570	1,088
Capital Invested,	$6,018,825	$12,586,880	$271,200	$33,704.674	$10,052,200	$6,627,000	$69,260,279	$98,409,769
Lbs. Cotton used,	23,733,165	51,002,324	1,447,250	134,012,759	41,614,797	31,891,011	283,701,306	422,704,975
Value Raw Material.	$3,319,335	7,128,196	181,030	17,224,592	5,799,223	4,028,406	37,680,782	57,331,496
No. of Spindles,	281,056	636,788	17,600	1,673,498	814,564	435,466	3,858,962	5,235,727
" Looms,	6,877	17,336	362	42,779	17,315	8,975	93,344	126,313
Males Employed,	1,828	8,829	157	18,691	6,353	4,028	29,886	46,766
Females do.	4,936	9,001	222	24,760	7,724	4,974	51,617	75,206
Annual Cost Labor,	$1,368,888	$2,888,604	$78,468	$7,798,476	$2,847,804	$1,743,480	$16,725,720	$23,907,020
Val. Product in 1850,	$2,630,616	$8,861,749	$280,300	$21,394,401	$6,495,972	$4,122,952	$43,785,990	$65,501,687
" " 1860,	6,235,628	13,699,994	357,450	38,004,255	12,151,191	8,911,387	79,359,900	116,334,229
Increase per cent.	140.8	50 4	27.5	77.58	87.05	116.14	81.24	77.6
Product in Yards,	69,377,000	151,713,609	4,030,000	415,291,438	147,652,300	78,161,000	857,225,347	1,148,252,406
Yds. of Print Cloths,	3,000,000	25,621,750	2,100,000	76,691,280	79,734,837	24,539,515	211,687,382	271,857,000
Lbs. Yarn & Thread,	481,823	221,000	576,000	3,776,340	5,072,114	2,282,250	12,409,527	47,241,603
" Bat'g, Wad'g, &c.	200,000	290,000	95,000	3,200,000	306,240	1.557,000	5,648,240	12,987,956
" Cordage & Twine,				1,244,762	1,028,740	2,347,775	4,621,277	4,876,277
No Seamless Bags.	1.250,000	2.800,000		145,600		730,000	4,925,600	6,235,600

A LIST OF PRINCIPAL MANUFACTURERS OF COTTON GOODS IN THE NEW ENGLAND STATES, IN 1860.

Maine.

Kennebec Co. (sheetings and flannels), Daniel Williams, agent, Augusta.
Laconia Manufac. Co. (drills, sheetings and shirtings), And. Haines, agent, Biddeford.
Pepperell Manuf. Co. (ditto,) W. P. Haines, agent, "
Cabot Co. (ditto), Benjamin Greene, agent, Brunswick.
Dana & Co. (warp), Gray.
Hallowell Co. (shirting), B. Mowry, agent, Hallowell.
Bates Manufacturing Co. (sheetings and pant stuffs), Benj'n E. Bates, treasurer, Lewiston.
Porter Mill (brown sheetings and shirtings), R. A. Budlong, agent, "
Hill Manufacturing Co. (sheetings and shirtings), "
Androscoggin Mills (new.)
Lincoln Mills (silecias), Lewiston.
King, Joseph R. (boot and shoe webbing,) Monmouth.
Stanton, Thomas L. (ditto), "
York Manufacturing Com'y (plaids and twills), Samuel Batchelder, treasurer, Saco.
Springvale Manufacturing Com'ny, Oliver D. Boyd, superintendent, Sanford.
Portsmouth Co. (sheetings), Samuel Hale, treasurer, S. Berwick.
Richardson, Joshua (batting), Saccarappa.
Westbrook Manufacturing Co., R. E Wood, treasurer, Westbrook.
Wood, Ephraim (yarn), Winthrop.
Royal River Manufact'ing Co. (batting, yarn and twine), H. J. Libby, treasurer, Yarmouth.

New Hampshire.

Skinner, Barton, Chesterfield.
Briggs, Arnold & Com'y (yard-wide cloths for bleaching), Claremont.
Monadnoc Mills Com'ny (jeans and sheetings), "
Brown, H. H. & J. S. (print cloths, 64 square), Concord.
Cocheco Manufacturing Co. (printing cloths and prints), Dover.
Exeter Manufacturing Co. (No. 24 sheetings), Exeter.
Dodge, Geo. W. (batting), Hampton Falls.
Pepper, J. & W. (hose), Holderness.
Hooksett Mill (print cloths), Hooksett.
Holt & Jones (batting), Hudson.
Bascom, Alonzo & Co. (denims and sheeting), Jaffrey.
Belknap Mills, Bailey & Gleason (cotton cassimeres), Laconia.
Gilford Mechanics' and Manufac'ng Co. (cottonades), "
Winnipisseogee Lake Manufac'ring Company, Lake Village, near "
Amoskeag Duck and Bag Co., Manchester.
Amoskeag Manufacturing Co., E. A. Straw, agent (see page —), "
Manchester Print Works (see page —), Waterman Smith, agent, "
Stark Mills (see page —), Phineas Adams, agent, "
Columbian Manufacturing Com'ny (denims), C. P. Richardson, ag't, Mason.
Souhegan Manufacturing Company (denims), David Gillis, agent, Milford.
Thompson, Robert. (batting), "
Harbor Manufacturing Co. (sheetings), Nashua.
Jackson Company (shirtings and sheetings), B. Saunders, agent, "
Nashua Manufacturing Company, D. Hussey, agent, "
Edwards, Parker, (sheetings), Monsonville, Nelson.
Brown, H. W. (tickings), New Ipswich.
Columbian Manufacturing Com'ny (denims), "
Haynes, W. (cotton batting), Newmarket.
Newmarket Manufac'ng Co. (sheetings, shirtings and drillings), "
Pembroke Mills (print cloths), Pembroke.
Livingston & Lynch (batting), Peterboro'.
Peterboro' Manufacturing Co. (drillings), Fred'k L. Livingston, agent, "
Phœnix Factory, D. W. Johnson, agent, "
Union Manufacturing Co. (sheetings, shirtings, umbrella cloths, and drillings), J. W. Little, agent, "
Pittsfield Manufacturing Company (shirtings), Pittsfield.

Portsmouth Steam Factory (yarns and spool-cotton of all numbers), William Stearns, agent, Portsmouth.
Rockingham Mills (narrow tapes and boot-webbing, worsted and mohair braid), Charles Amory, agent, "
Salmon Falls Manufacturing Com'y (30 and 38-inch drillings, yard sheetings and cotton flannels), B. W. Watson, treasurer, Salmon Falls.
Great Falls Manufac'ing Co. (sheetings, shirtings, drillings, &c.), Great Falls.
Tioga Mills (yarn, &c.), Upper Gilmanton.
Rockland Manufacturing Co. (cotton flannels and batting), Chas. Kelley, agent, North Weare.

Vermont.

Boardman & Carpenter (wadding), Bennington.
Essex, Jeremiah, (French glazed batting), North Bennington.
Estes, Truman, (print cloths), North "
Robinson & Parsons (ditto), " "
Winooski Mill Company, M. Noyes, treasurer, Burlington.
Pitts, H. W. (cotton warps), Middlebury.
Fullerton, Martin & Co. (cotton warp and sheeting), Springfield.
Pope, J. A. (print cloths), Perkinsville.
Raymond, M. (chair stuffs), Upper Falls.

Massachusetts.

Anthony & Adams (battings), Adams.
Adams, Brothers, & Co. (sheetings), "
Andrews, R. R. (sheetings), "
Clinton, Wm. M. (printing cloths), "
Jenks, Elisha (print cloths), "
Plunkett & Wheeler (warps and sheetings), "
Pollock, Wm. & Co. (cotton warps), "
Arnold, O. & Co. (printing cloth), S. H. Arnold, agent, North Adams.
Bly, George W., "
Brayton, Thos. A. (jeans and sheetings), "
Jackson, Ray & Co. (print cloth), "
Johnson, S. & Co., (warps), "
Richardson, A. W. & Co. (print cloth), "
Union Print Works, Arnold and Gaylord, agents, "
Dearborn, David L., Amesbury.
Webster, Jonathan B., "
Whitney Mill, O. Whitney, jr., Ashburnham.
Cheney, A. L. (batting), Athol Depot.
Snow, C. B. (sheetings), "
Daneville Manufacturing Co., Attleboro'.
Foster, S. & W. (sheetings), "
Hebron Manufacturing Company, B. B. & R. Knight (sheetings), "
Smith, Edwin (light cloth), Auburn.
Arnold, Noah J., Bellingham.
Cary, Wm. H., North "
Aldrich, Andrew J. N., Blackstone.
Blackstone Manufacturing Co., "
Clinton Manufact. Co. (yarn), Boylston.
Brookfield Manufacturing Co. (blue denims), E. Brookfield.
Kaley, Timothy (tidy cotton), Canton.
Mansfield & Co. (wicking, etc.), "
Neponset Cotton Factory, "
Shepard, J. S. (wicking, &c.), "
Jenkins, Tripp, & Co. (lacings), Carver.
Fosdick, Wm. (batting), Charlestown.
Eagle Mills, Chelmsford.
Dwight Manufact. Co., S. Adams, agent, Chicopee.
Chicopee Manufact. Co., E. Blake, agent, "
Clinton Manufacturing Co., Clinton.
Lancaster Mills (ginghams), "
Lancaster Quilt Co. (counterpanes), "
Griswoldville Manufact. Co., Coleraine.
Shattuck & Whiting (print goods), "
Wright, B. W. (suspender yarn), Conway.
Cummings, John (batting), N. Dartmouth.
Dedham Manufacturing Co., Readville, Dedham.
Norfolk Manufacturing Co., Mill Village, "
Lincoln, L. & Co. (yarn), North Dighton.
Shore, T. & Co. (print cloths and thread), "
Whitin, P. & Sons, Whitinsville.
Pearson's Factory (duck, &c.), Dracut.
Nashawannock Manufact. Co. (suspenders), &c., Easthampton.
Keith, Rotch, & Co. (thread), Easton.
Pratt, Amos, " "
Morse, E. J. W. & Co., " South "
Morse, S. W. & Co., (cord and wicking), South Easton.
American Linen Co., Fall River.
Annawan Cotton Mills, "
Fall River Cotton Mills, "
Fall River Print Works, "
Massasoit Steam Mill Co., "
Metacomet Mill, "
Pocasset Manufacturing Co., "
Troy Cotton and Woolen Co., "
Union Mill Co., "
Watuppa Cotton Mill, "
Blackburn, George, & Co., Oliver Ellis, agent, Fitchburg.
Gill, J. S. & J. (sheetings, &c.), "
Sherwin, Levi, " "

Cottrell, S. H. (printing cloth), Franklin.
Daniels. Adams (batts and wicks), “
Porter, Bradford G. (twine), Freetown.
Pratt, L. S., Grafton.
Fisher, Erastus, Farnumsville, “
Wright & Morse (shirtings), “
Claflin Mills (printing goods), Asa F. Smith, agent, N. E. Village, “
Davis Mill (sheetings), “
Saunders's Cotton Mills, “
Monument Mills, (warps), Great Barrington.
Calvin, A. P. (cotton flannel), Holden.
Morse, A. & Co. (cotton cloth), “
Pratt, C. M., “ “
Smith, Asa F., “ “
Waterhouse, Joseph, Holliston.
Lyman Mills, Holyoke.
Hampden Mills, “
Dane Manufact. Co. (drillings), Ipswich.
Heard, Augustine (light drillings), “
Newcomb, Thos & Co. (thread), Kingston.
Wilder, C. L. (sheetings), Lancaster.
Atlantic and other Mills in Lawrence, see *Manufactures of Lawrence.*
Beach, Royce, & Co. (seamless bags), Lee.
Appleton Company and other Mills in Lowell, see *Manufactures of Lowell.*
Ludlow Manufacturing Co., H. Root, agent, Ludlow.
East Mansfield Manufacturing Co. (sea island cotton thread), E. Mansfield.
Mansfield Thread Co. Attlebor'o.
Lynch. J. Q. (batting), E. Foxboro'.
Cary, Wm. H. (cloth), Medway.
Medway Cotton Manuf. Co. (yarn), “
Eaton, Edward (batting), “
Pierce & Farrington (warps), “
Wilson, E. C. & Co. (sea island thread) “
Boyd & Walker (thread and wadding), Rockville.
Methuen Manufacturing Co., Methuen.
Namasket Mill Co., Middleboro'.
Hopedale Machine Co, Milford.
Cordis Manufact. Co. (prints), Millbury.
Emerson, Jason, (sheetings), “
Greene, Waters & Co., “
Rhodes & Tenney, (warps), “
Singleton Mills (sheetings), “
Smith, S., “
Waters, A. H. & Co. (prints), “
Wheeler, J. D. (sheetings). “
Hampden Manuf. Co. (satinets), Monson.
Wamsutta Mills (sheetings and shirtings), New Bedford.
Globe Steam Mills (jeans, printing cloth, cotton flannels), Newburyport.
Bartlett Steam Mills (No. 40 sheetings, &c.), John Balch, agent, “
James Steam Mills (sheetings and shirtings), Wm. C. Balch, agent “
Ocean Steam Mills (print cloths), “
Newton Mills (printing cloths), Newton.
Greenville Manufacturing Co. (drills and shirtings), Northampton.
Pratt, L. S. & Co. (sheetings), Northboro'.
Newcomb, Nath'l (batting), Norton.
Wheaton Manufacturing Co. (cloth and wadding), “
Huguenot Mills (sheetings), Chamberlin, McGaw & Co. Oxford.
Phœnix Mills (sheetings), “
Protection Mills (sheetings), “
Smith, E. W. (sheetings), “
Thorndike Co. (ticks, shirtings, etc.), Palmer.
Boston Duck Co. (cotton duck), “
Palmer Co. (drillings), Pawtucket.
Barrows & Ingraham (shirtings), “
Dunnell Manuf. Co. (calicoes, &c.), “
French & Read (print cloths), “
Gerauld. H. & Son (print cloths), “
Pratt, Francis & Co. (threads, yarns, and braids), “
Peck, E. & J. S. (cotton warps), Pittsfield.
Plunkett, Clapp & Co. (sheetings), “
Old Colony Batt. Co., Plymouth.
Samoset Mills (thread), “
Jenkins Tripp & Co. (yarn), “
Old Colony Duck Co., Chiltonville.
Russell Mills (duck), “
Brown, Eleazer A. & Co. (twine), Rehoboth.
Orleans Manuf. Co. (print cloths), “
Rockport Steam Cotton Mills, Rockport.
Naumkeag Steam Cotton Co., Salem.
Newmarket Manuf. Co. (shirtings, sheetings, jeans), J. Webster, treas., Salisbury.
Powow River Mills (yarn, etc.), “
Cove Mills (Bowen & Batty), Seekonk.
Mann, G. R & Wm. R. (duck), Sharon.
Longley & Worcester (sheetings), Shirley.
Lake Cotton Mills (sheetings), “
Longley, I. (sheetings), “
Phœnix Co. “ “
Cordaville Manuf. Co. Southboro'.
Dresser Manuf. Co. Southbridge.
Leonard & Dresser, (sheetings). “
Glasgow Co. (ginghams), South Hadley Falls, South Hadley.
Indian Orchard Mills (sheetings, etc.), G. W. Holt, agent, Springfield.
Brown, Nathan G. (carpet warps), Stockbridge.
Sturbridge Cot. Mills, (print cloths), Sturbridge.
Munsell, Thomas E. (batts, wicks), Sunderland.
Manchaug Manufactur'g Co. (sheetings), Sutton.
Sutton Manufacturing Co. (print cloths), “
Albro & Anthony (corset jeans), Taunton.
Dean Cotton & Machine Co, “
Dean, Williams & Rouse, “
Shepard, Silas (flannels), “
Whittenton Man. Co. “
Westville Manuf. Co., “
Whitin. P & Son (fine sheetings), Uxbridge.
Clapp, Simeon (yarn & wicking), Walpole.
Guild, George (thread and yarn), “
Manning, Glover & Co. (batting), “
Stetson, Joshua, jr. (yarn,) “

Anderson, J. P. (yarn), Walpole.
Boston Manufacturing Co., Waltham.
Otis Company (denims), Ware.
Knowles Lucien J. (warp), Warren.
Warren Cotton Mills (denims), "
Slater's Mills (print goods), Webster.
Union Mills (print goods), "
Beaman Manufacturing Co. (jeans and counterpanes), West Boylston.
Harris, L. M. & Co. (cotton flannels), " "
Holbrook & Harris (sheetings), " "
Schouler, John & Brothers, W. Cambridge.
Whitman, W. & Co. (warps), Westfield.
Westport Man'ing Co (carpet warp, wrapping twine, and batting), Westport.
Agawam Canal Co. (sheetings and jeans), William Melcher, agent, W. Springfield.
Hayden Manufacturing Co. (thread, etc.), Williamsburg.
Southworth & Walley, Williamstown.
Elmer & Bro., S. Williamstown.
White, Nelson D. Winchendon.
Mills & Co. (batts & wadding), Winchester.
Curtis, Albert, (drillings and sheetings), Worcester.
Sayles, Caleb W. (batting), Wrentham.

Rhode Island.

Ashton Mills, Ashton.
Bristol Steam Mill, Bristol.
Pokanoket Mills, Jacob Babbitt, "
Ross, John L. (cotton warps), Burrillville.
Whipple, Daniel S. (warps), "
Money, J. W. (plaids), Charlestown.
Chepachet Mill (H. B. Lyman), Chepachet.
Arkwright Manufacturing Co., Coventry.
Chace Mill Co. (print cloths), "
Kilton, John J. (bleach goods), "
Washington Co. (sheetings), "
Coventry Co. (print cloths and sheetings), T. D. Bowen, agent, "
Harris Manufacturing Co. "
Valley Falls Co. (Print cloths and sheetings), H. & S. B. Chace, Cumberland.
Earl, T. & Co., "
Fessenden, Benj. (printing cloths), "
Rawson, Wm. M., "
Green, W. R. & Co., Exeter.
Harris, James T., "
Greene, C. C. (warps), "
Hope Manuf. Co., S. G. Allen, Fiskville.
Jackson Factory (Chas. Jackson), "
Winsor, Stephen & Bro's, W. Gloucester.
Union & Wadawannuck Mills, and Kent Printing Co., E. Greenwich.
W. Greenwich.
Hopkins, D. (warp and twine), "
Tripp, Charles (fluid-wicking), "
Hoxsie, B. R. (lamp-wicking), "
Chace's Thread Mills, Mt. Hope Village.
Chase, Augustus, (wicks and batts), "
Cornell, William (spool cotton), "
Fall River Thread Co., "
Canonchet Manufact'ing Co., Hopkinton.
Kenyon, Benj. B. (yarn, &c.), "
Franklin Manufacturing Co., Johnston.
Larchar, William, "
Narragansett Mills (warps), N. Kingston.
Manville Mills, Manville.
Newport Manufacturing Co. (yarns, batts, wicks, and warp), Newport.
Perry Mill Co., "
Touro Manufacturing Co., "
Atlantic Delaine Co. (print cloths,) George W. Chapin, Treas'r, Olneyville.
Randall Mill, William A. Pierce, "
Simmonsville Mills, W. S. Simmons, "
Succerhead Mills, L. F. Goodwin, "
Turner's Wadding Works, S. Turner, "
Dunnell Manufacturing Co., Pawtucket.
Dennis, James (print cloths), "
Dexter, N. G. B. (spool cotton), "
Goff, Cranston & Brownell, "
Green & Daniels (spool cotton), "
Joslin, W. H. (wicking), "
Littlefield Brothers (thread), "
Pawtucket Manufacturing Co., "
Smith, Jos. Jr. (batting), "
Allendale Manufacturing Co., N. Providence.
Centerdale Manufacturing Co., "
Dyerville Manufacturing Co., Amos N. Beckwith, treasurer, "
Lyman Mill (H. B. Lyman), "
Manton Manufacturing Co., "
Allen, C. & Co., Providence.
Allen, Philip & Sons, "
Barrows, Cornelius (sheetings), "
Burgess, F. S., "
Cutler, Edward A., "
Fletcher & Brothers (lamp-wicks, boot-laces, braids, &c.), "
Greene Manufacturing Co. (shirtings and sheetings), "
Graystone Mills (shirtings), "
Harrison Steam Mills (print cloths), F. Burgess, treasurer, "
Heaton & Cowing (shoe braids and lacings), "
Hutchins, S. & Co., "
Pacific Mills (print cloths), "
Parker & Webster (seven-eighths and yard-wide shirtings), "
Phœnix Mills (sheetings and print goods), C. Lippitt, agent, "
Randall, Stephen, "
Rhodes, James T., "
Robinson, W. A. & Co., "
Rogers, Joseph, "
Simmons, Samuel R., "

Slater, Samuel & Sons (print cloths), Providence.
Smith, A. D. and J. Y. & Co., “
Sprague A. & W. (print cloths), “
Williams, A. A. & Co. (yarns, wicks, warps, &c.), “
Woonasquatucket Print Works (G. M. Richmond & Sons), “
Arcadian Manufacturing Co., Richmond.
Harris, James T. & Co., Carolina Mills (pant goods), “
Clark, Charles & Co. “ “ “
Kenyon, E. (linseys), “ “ “
Kenyon, J. H. & A. W., “ “ “
Weeden, G. (linseys), Carolina Mills, “
Centreville Manufacturing Co., Rockville.
Rockville Manufacturing Co., “
Moscow Manufacturing Co., “
Clayville Mills (D. Remington & Son), Scituate.
Fiskville Factory (C. Jackson), “
Rockland Manufacturing Co., “
Ross, Henry D. (print cloths), “
Harris & Bro. (print cloths), N. Scituate.
Harris, Thomas (drillings), “
Randall, N. & S. (print cloths), “
Scituate Manufacturing Co. (print cloths), Wm. M. Bailey, Treas., “
Ashland Manufacturing Co., S. Scituate.
Slater, J. & W., Slaterville.
Albion Company, Smithfield.
Benedict Stephen (printing cloths). Central Falls, “
Benedict & Wood (printing cloths), Central Falls, “
Granite Mill (W. Vaughan, agent), “
Manchester Print Works, “
Stafford, R. J. (see page —), “
Thurber, L. & A. (print cloths), Central Falls, “
Walker, Francis (cotton warps), Central Falls, “
Wood & Adams (printing cloths and sewing thread), Central Falls, “
Allen, Crawford, & Co., Georgiaville, “
Smithfield Manufacturing Co. (print goods), Smithfield.
Lonsdale Co., Lonsdale, “
Dexter & Brother (yarn), Valley Falls.
Abbott Run Company, (C. Allen & Co.), “
Warren Manufacturing Co. (sheetings), J. O. Waterman, Warren.
Arctic Mills (A. & W. Sprague), Warwick.
Bowen Cotton Manufacturing Co., “
Crompton Co. (prints), Wm. T. Dorrance, treasurer, “
Centreville Cotton Mill (shirtings and sheetings), B. Lapham, “
Lippitt Manufacturing Co. (shirtings and sheetings), Christopher Lippitt, “
Pontiac Mill (shirtings, &c), B. B. & R. Knight, “
Quidnick Co. (print goods), “
Natic Mills (print cloths), “
White Rock Manufacturing Co., Westerly.
Wheeden, J. E., agent (cottonades), “
Hamilton Mills (yarns), Wickford.
Aldrich, Arnold, Woonsocket.
Ballou, Geo. C. & Sons (print cloths), “
Bartlett, John (sheetings). “
Branch Warp Manufacturing Co., “
Clinton Manufacturing Co., “
Globe Mills, “
Groton Manufacturing Co., “
Harris, Edward, (also woolens), “
Hamilton Manufacturing Co., “
Harrison Mill (sheetings), “
Jenckes, Job & Sons (print cloths), “
Social Manufacturing Co., “
Woonsocket Co. (print cloths), “
Aldrich. D. L. (yarn, &c.), Wyoming.
Hope Valley Mills (yarns, &c.) “
Locustville Mill (print cloths), Dan'l G. Sherman, agent, “
Sheldon, John T. (yarn), “
Tifft Mill (yarns, &c.), “
Wyoming Mill (print cloths), “

Connecticut.

Avon Manufacturing Co. (yarns), Avon.
Kent Manufacturing Co., “ Bozrah.
Fitch, Asa (sheetings), Fitchville.
Keeler, Frederick (batting), Brookfield.
Sawyer, Tinker & Co. (bags and duck), Colebrook.
Willimantic Company, Columbia.
East Haddam Duck Co., East Haddam.
Atlantic Duck Co., Moodus.
Cowdrey, Rogers & Co. (duck), “
Moodus Manuf'g Co. (print cloths), “
Smith, Walter (duck), “
Williams Duck Co., “
Denner & Slate (batting), Ellington.
Law, J. & A. (cotton batting), Enfield.
Goddard & Co. (sheetings, &c.), Fisherville.
Sprague, A. & W., Lord's Bridge, Franklin.
Plunkett, Wyllys & Co., S. Glastenbury.
Post, J. H. & Co., “
Ashland Co., Adams, agent, Griswold.
Nichols, S. F. & Bro. (cotton twine), “
Slater, J. & W. (denims and stripes), Griswold.
Pope & Carroll (sheetings), “
Weatherhead, G. (sheetings), “
Hubbard, Henry G., Higanum, Haddam.
Dunham, A. & Co., Hartford.
Greenwoods Co. (cotton duck), “
Slate, Dwight & Co. (wadding), “
Union Manufacturing Co. (plaids), “
Barber, Gardner & Co. (batts), Hebron.
Gray, William (batting), “
Hebron Manufact. Co. (batting and wicks), “

Jencks, Leavins (prints), Centre Killingly.
Elliottville Manufact. Co. (print cloths), East Killingly.
Himes, John L., " "
Robinson, W. A. & Co. (prints), " "
Wescott & Pray, " "
Young, E. S., " "
Capron, O. M., W. Killingly.
Danielsonville Manufacturing Co. (sheetings), Danielsonville, "
Quinebaug Co., " "
Whitmore, N., "
Ballou, L. & Co., N. Killingly.
Daniels & Sayles, "
Williamsville Manufact. Co., "
Corey, Joseph, Lebanon.
Bliss, Willard (warps), Lisbon.
Sprague, A. & W. (print cloths), "
Union Manufact. Co. (ginghams, plaids, and stripes), Manchester.
Globe Mills Co. (warps), Jos. Parker, agent, S. Manchester.
Union Manufacturing Co., Marlboro'.
Middletown.
Wilcox & Hall (musquito bars), "
Uncasville Manufacturing Co., Montville.
Greenwood Manufact. Co., New Hartford.
Smith & Brown (ducking), "
Smith, D. B., Pine Meadow, "
N. Stonington.
Kenyon, E. & C. H., Hopkinton, "
Falls Co. (denims, ticks, and stripes), Gardner Greene, treasurer, Norwich.
Hutchins, F. W. (sheetings), "
Shetucket Co., "
Day & Jenks, "
Perkins, Timothy (batts and yarn), Orange.
Almy, Samson, Plainfield.
Wauregan Company, "
Central Co. (prints), "
Webster, Felton H. (sheetings), "
Ames, John B. (print cloths), "
Thomas, Seth (sheetings), Plymouth.
Morse, M. S. & Co. (sheetings), Pomfret.
Nightingale, George C. & Co., "
Rhodesville Company, "
Wilkinson, Edmund (sheetings), "
Orleans Manufacturing Co. (print cloths), Rehoboth.
Stone Mill Co., Rockville.
Glyn Co. (warps), M. B. Harvey, agent, Stafford.
Valley Manufacturing Co. (warps), "
Granite Mill Co. (bleached cottons), George M. Ives, agent, "
Fairman, John L. (batting), W. Stafford.
Kimball & Aldrich, Sterling.
Sterling Mills, Arnold, Fenner & Co., "
Sterling Stone Factory, Oneca Co., "
Masonville Co., Thompson.
Ross, John E. (twine), "
Walker & Sharpe (duck, shoe linings, &c.), W. Thompson.
Luther Esek (yarns, &c.), Tolland.
Centreville Co. (seamless bags), Vernon.
Valley Falls Co., "
Phœnix Mills Co., Vernon Depot.
Jenks, Hiram (wicking), Voluntown.
Ross, John L. (jeans), "
Potter & Dixon (negro cloths), "
Griswold, Martin (braid), Watertown.
Talcott & Brace (batts), West Hartford.
Lee, Thomas R. (carpet warps), Westport.
Wood, William (wadding), "
Natchaug Manufacturing Co., Windham.
Cotton Sail Twine Co. (W. C. Jillson, agent), Willimantic.
Dunham Manufacturing Co., "
Smithville Manufacturing Co., (W. Hayden, agent), "
Willimantic Duck Co. (shirtings), "
Willimantic Linen Co. (W. P. Abernethy, agent), "
Windham Cotton Manufacturing Co. (J. Tracy, agent), "
Harris & Brothers (cloths), Windsor.
Connecticut River Mills (thread), "
Harris Brothers (twine), Woodstock.
May, Ezra C. (spool thread), "
Randall, James (twine), "
Smith & Stetson, "
Warner, Daniel (twine), "
Warner, Thomas & Son (twine), "

STATISTICS OF WOOLEN GOODS PRODUCED IN NEW ENGLAND FOR THE YEAR ENDING JUNE 1, 1860.

(Prepared at Census Office expressly for this work, and never before published.)

	Maine.	New Hamp're.	Vermont.	Massachusetts.	Rhode Island.	Connecticut.	Total in N.E.States.	Total in U. States.
No. Establishments,	63	68	51	138	57	84	461	1,967
Capital Invested,	$984,600	$1,441,850	$1,749,850	$8,978,153	$3,168,500	$2,491,000	$18,813,953	$31,900,999
Pounds Wool used,	2,619,891	3,903,204	4,092,510	33,535,197	6,832,600	7,179,819	58,163,221	88,804,319
" Cotton in Mixed Goods,	82,500	89,000	279,500	4,855,370	3,056,200	1,472,508	9,835,078	15,200,061
Cost Raw Materials,	$1,091,272	$1,636,598	$1,681,826	$12,442,525	$4,070,224	$4,043,124	$24,965,568	$38,424,532
Males Employed,	593	666	901	7,624	2,593	2,308	14,885	26,026
Females do.	555	672	1,178	5,280	1,636	1,459	10,780	16,618
Ann'l Cost of Labor,	$279,392	$422,870	$414,225	$3,020,650	$1,069,176	$949,020	$6,155,336	$10,087,773
Val.Product in 1850,	$1,022,929	$2,139,967	$1,820,769	$12,781,514	$2,504,700	$4,974,959	$25,244,838	$45,281,764
" " 1860,	$1,835,138	$2,633,310	$2,961,137	$19,665,787	$6,915,205	$6,840,220	$40,850,497	$64,243,260
Per cent. Increase,	79.4	23.05	62.63	53.85	176.08	87.49	61.81	41.87
Yards Woolen cloth,	2,509,100	5,782,641	3,975,882	34,399,348	19,343,600	14,301,043	80,311,614	124,897,882
Pounds of Yarn,	17,100	341,630	3000	2,160,001	112,800		2,634,601	6,401,306
" Rolls,	192,111	69,700	39,548	17,300			318,659	5,061,405
Pairs of Blankets,	96,680	44,400		57,207			198,287	314,874
No. of Shawls,				157,000	100,000		257,000	616,400
Value of Hosiery,		$573,794	$102,800	$314,120		$1,383,528	$2,374,242	$7,268,906

A LIST OF PRINCIPAL MANUFACTURERS OF WOOLEN GOODS IN THE NEW ENGLAND STATES, IN 1860.

Maine.

Muller, John, (yarn, blankets, &c.), Acton.
Holland, Thos., (cloth & blankets), Alfred.
Currier, Owen, (carding), Athens.
Whitman, Zenas, (do.), E. Auburn.
Pendleton, E. O. (do.), Bangor.
Farnham & Towle (do.), Belgrade.
Clough, Eber, (satinets), Bethel.
Gibbs, R. (flannels & blankets), Bridgton.
Elliott, Eaton S. (carding), Bowdoin.
Brooks, Ira, (do.), E. Bowdoinham.
Walker, Joseph, (do.), Brooksville.
Bean, R. & N. (do.), Brownfield.
Whitten, William, (do.), Brunswick.
Cole, Addison G. (do.), Buckfield.
Conant, N. L. (do.), Bucksport.
Buxton Manufac'ring Co. (satinets), O. Tracey, agent, W. Buxton.
Clark, Aaron, " "
Parker, William, Cornish.
Abbott & Co. A. (cassimeres, doeskins and flannels), Dexter.
Robinson, R. W. (do.), "
Brown, Stephen P. (flannels), Dover.
Mayo & Son do.), Foxcroft.
Jordan, Joshua (carding), "
Tapley, Sewall W. (carding), Frankfort.
Billings, Tobias, (do.), Freedom.
Tucker, I. N. & Co., (cassimeres and flannels), Gardiner.
Howe, Joel, (satinets and stocking-yarn), Hanover.
Nason, Moses, (carding), Kennebunk.
Lewiston Falls Manufac'ng Co., Lewiston.
Holland, Joshua, (blankets), Limerick.
Lyman, Daniel, (carding), Lyman.
Corbett, J. M. & D. O. (satinets), Lisbon.
Morse, S. A. (carding), Machias.
Jumper, Cyrus, (flannels & satinets), Milo.
Parsons, Joshua, (carding), W. Minot.
King, Amos D. do.), Mt. Vernon.
Simes, Isaac, (satinets), Mt. Desert.
Beard, H. J. (carding), New Sharon.
Robinson, Edward, Sebec.
Hargreaves, Edward, (flannels), N. Shapleigh.
North Berwick Co. (satinets), N. Berwick,
Hobbs, Isaac M. (carding), S. "
Cole, Horatio G. (do.), Norway.
Robinson, Joseph, (flannels), Oxford.
Oxford Manufacturing Co. (flannels and blankets), "
Oxford Woolen Co. (flannels), "
Readfield Woolen Co. (cassimeres, tweeds, &c.), Readfield.
Miller, William, (flannels), Sanford.
Newichawanock Co. (bed-blankets and flannels), S. Berwick.
French, H. W. (carding), Sandy Point.
French, John, " "
Gleason, Folger & Co. (cassimeres and yarns), Union.
Vassalboro' Manufacturing Co. (cassimeres), N. Vassalboro'.
Lang, John D. (do.) "
Johnson, Fuller & Co. (cassimeres, yarns, &c.), Warren.

Sabattus Manufact'ing Co. (tweeds, flannels, &c.), Sabattusville.
Partridge, L. R. (stocking-yarn), Whitefield.
E. Wilton Manuf'ng Co. (flannels), Wilton.
Furnal, D. (yarns), Wilton.
Pope & Co., Isaiah, (satinets), Windham.
Chace, Josiah, (fulled cloth and yarn), York.

New Hampshire.

Adams, Nathan, (cassimeres, flannels and yarns), Acworth.
Ashuelot Manuf'ng Co. (cloths), Ashuelot.
Babcock, Joshua M., Barnstead.
Harris & Faulkner (flannels), Fisherville.
Shaw, William E. (yarns and satinets), Bristol.
Dole, E. & Co. (satinets, &c.), Campton.
Balcom, George L. (doeskins), Claremont.
Holden, B. F. & D. (flannels and hosiery), W. Concord.
Mercer, Walter & J. (yarn), Cornish.
Sawyer, F. A. & J. (flannels), Dover.
Harris, M. & M. W. (cassimeres), Dublin.
Cheshire Mills (flannels), Harrisville.
Fulton & Huntress (cassimeres, &c.), Effingham.
Shaker Mills Co. (cassimeres and flannels), Enfield.
Sullaway, I. W. (yarn and socks), "
Norris, C. M. (flannels), Epping.
Pearson, Enoch, "
Prescott, Jacob E. (flannels, &c.), "
Gilford Mechanics' Manufacturing Co., Woodbury Melcher, agent, Gilford.
Winnipisseogee Lake Manufact'ing Co., Lake Village, "
Ward, J. & Co. (broadcloths), Gilsum.
Young, P, (flannels and satinets), Grafton.
Dodge & Huntington (socks), Hanover.
Royden & Bishop (cashmeretts), Hinsdale.
Haile & Frost (do.), "
Pepper, J. & W. (shirts, &c.), Holderness.
Patterson, J. & D. N. (tweeds and cassimeres), Hopkinton.
Truise, Robert L. (cassimeres), E. Jaffrey.
Faulkner & Colony (flannels), Keene.
Appleton, Thos. (hosiery), Laconia.
Busiel, John W. (do.) "
Cunningham, Jas. (do.) "
Busiel, Lewis F. (yarns), Laconia.
Pepper, John. (hosiery), "
Pulcifer, Lyman B. (hosiery yarns), "
Sargent, Moses, (do. do.) "
Bailey, Zalmon, (carding), Lisbon.
Hale, E. J. M. (flannels), Littleton.
Howarth, James, (wool yarns), Loudon,
Manchester Print Works, Manchester.
Peters & Bond (flannels, &c.), "
Townsend, James, (yarns), Marlboro'.
Townsend, John, (flannels), Milton.
Gordon, J. C. (yarns), New Hampton.
Dean, Solomon, (flannels), Newport.
Goodrich, David J. (yarns), "
Hatch & Nourse (flannels), "
Richards, Dexter, (do.), "
Tilton, J. & J. C. (satinets), Northfield.
Wyman, Charles H. (yarns, &c.), Pelham.
Noone & Cochran, Peterboro'.
Norway Plains Co., Rochester.
Gonic Manufacturing Co. (flannels), Gonic.
Bailey & Wheeler (wool frocking), Salem.
Beckford, Henry S. (stocking-yarn), N. "
Morrison & Co. (yarns), " "
Taylor, John, (flannels), " "
Tilton, Alex'r H. (tweeds), Sanbornton.
Blanchard, August. (satinets), Sandwich.
Smith, Wm. M., W. Stewartstown.
Hathorn, Levi, (flannels and tweeds), Washington.
Sawyer, Moses, (cassimeres and doeskins), N. Weare.
Johnson & Colby, Wilmot.
Wilton Man'ing Co. (carpet yarns), Wilton.
Woolen Manufacturing Co., "
Ashuelot Manufacturing Co., Winchester.
Raymond & Turner, "
Fessenden, Stephen, Windham.
Springfield, I. W. (blankets), S. Wolfboro'.

Vermont.

Barnet Manufact'g Co. (doeskins), Barnet.
Gleason, W. Jr. (cassimeres), "
Bradford, H. E. (hosiery), Bennington.
Carter, John (wool-yarn), Barnet.
Greenbanks, Geo. (white flannels), "
Remick, James K. (satinets), "
Little, H. A (flannels), Barre.
Morecroft, William (flannels), "
Reynolds, John, (do.) "
Dorn & Payne (rolls for spinning), Benson.
Faulkner, Dwight (flannels), Bethel.
Whitmore & Dana, Brattleboro'.
Lemmet W. H. (cassimeres), Bridgewater.
Haines, H. & Son, Cabot.
Fullerton & Co. (doeskins), Cavendish.
Balcomb, G. L. & Co. (doesk's), Proctorsville.
Waterson, Joseph, Chelsea.
Sawyer, J. F. & T. R. (cashmerets), Chester.
Burlington Mills, Harding & Brothers (Black doeskins and fancy cassimeres), Winooski Falls, Colchester.
Greenbanks, B., Danville.
Kendall S. (com'n grey cloth), Enosburg.
Crockett & Shepardson, (cassim.), Fairfax.
Lyman, T. D. (cloths), N. Ferrisburgh.
Burgess, Walker & Co. (doeskins), Grafton.
Dean, P. W. & Co. (cassimeres), "
Dewey, A. G & Co. Hartford.
Parker, J. C. (flannels), "
Sturtevant, C. F., Hartland.
Dow, Nay & Co. (doeskins), Hinesburgh.
Dow & Pearle (satinets), Johnson.
Ward & Buffum, Ludlow.
Davenport & Clay (cassim'es), Middlebury.

Middlebury Manufact'g Co. (cassimeres and flannels), Middlebury.
Curtis & Story Milton.
N. G. Woolen Manufact'ng Co., Monkton.
Gould, Joseph (flannels), Northfield.
Blakely, R. & Son, Pawlet.
Marks, Ira, "
Carpenter, R. Jr. & Co. (satinets), N. Pownal.
Keyes, James & Co., Putney.
Merrill, D. & Co., Felchville, Reading.
Perry, S. & Co., Cambridgeport, Rockingham.
Farnsworth & Hoit (cassimeres) "
Kingsley, Chester (cassimeres), Salisbury.
Hunter, Nelson (fulled cloth), Sheldon.
Newell, Heron (fulled cloth), Shoreham.
Holmes, Whitmore, & Co., Springfield.
Faulkner, D. F. (flannels), Stockbridge.
Greenbanks, T. (do.) "
Merrick, Gay & Son (doeskins), "
Platt, Hiram (satinets), Swanton.
Cambridge, P. C., Union Village, Thetford.
Sartwell, T. J., N. Troy.
Thompson, Seabury & Blanchard (cassimeres), Waterbury.
Wells & Herron (flannels), Waterville.
Lewis, Benjamin, Wells.
White, L. C. (socks and flannels), Brownsville, West Windsor.
Woodward, S. (doeskins,) Woodstock.

Massachusetts.

Schouler, Wm. (flannels) S. Acton.
Briggs Brothers (Union cassimeres and meltons), Adams.
Blackington, S. & Son, (cassimeres), "
Brayton, S. W. & Co. (union cassimeres), N. Adams.
Tyler & Bliss (union cassimeres, &c., "
Blackinton & Phillips, S. Adams.
Dean & La Monte, "
Norton, Sykes & Co. (satinets), Agawam.
Salisbury Mills (doeskins), Amesbury.
Ballard Vale Co. (J. P. Bradlee), Andover.
Marland Man'ng Co. (fancy woolens), "
Belchertown Manuf'ing Co., Belchertown.
Tyler, Abner, "
Faulkner, J. R. & Co. (flan's), N. Billerica.
Bradford, Taft & Co. (cass'res), Blackstone.
Evans, Seagrave & Co., "
Ray, J. G. & Brothers (shoddy), "
Esty & Messenger, "
Farnums, No. 1 and 2 Mills, Millville, "
Millville Manufacturing Co., " "
Scott, John C. (satinets), " "
Morrison, A. & Co. (yarns), Braintree.
Draper, James (hoods, glove-linings, &c.), Canton.
French & Draper (hosiery), "
Baker & Bottomly (satinets), Charlton.
Baldwin Co. (worsted yarn), N. Chelmsford.
Concord Factory, E. C. Damon, Concord,
Conway Manufacturing Co., Conway.
Burk, Edmund (doeskins), "
Ford, John (satinets), Cummington.
Lloyd, Chas. do. "
Maverick Woolen Co. (cassim.), Dedham.
Dighton Manufacturing Co. Dighton.
Merrimac Woolen Mills, Dracut.
Perry, Jos. H. & Co. (satinets), Dudley.
Tufts Manufact'g Co. (broad cloth), "
Minot Manufact'g Co. (satinets), Enfield.
Swift River Manufac'g Co. (do), "
Wamsutta Steam Mill, Fall River.
J. Robinson's Sons (yarn), E. Falmouth.
Fitchburg Woolen Mill Co. (cassimeres), W. H. Vose, agent, Fitchburg.
C. J. Delehantry & Co., "
Wallis, S. (fancy goods & stockings), "
Saxonville Mills (yarns), Framingham.
Rockwood, Erastus (shoddy), Franklin.
Ray, F. B. (shoddy), Franklin.
Ayers & Aldrich (satinets), Granby.
Berkshire Woolen Co. (cassimeres), A. C Russell, agent, Great Barrington.
Kellogg, Charles T. " "
Leonard, Theo. (doeskins) Greenfield.
Hale, E. J. M., Groveland.
Barker, I. L. & G. W. (satinets) Hancock.
Taylor, William (yarns), "
Hinsdale, Fr. W. & Brother (Union broadcloths) Hinsdale Depot, Hinsdale.
Plunkett Woolen Co. (Union cloths and satinets), "
Chaffin, Royal H. (satinets), Holden.
Hall & Co. (do.) "
Taylor, Horace (do.) Huntington.
Brigg, Wm. W. & Co., Lawrence.
Washington Mills, "
Lee Woolen Co. (E. Smith), Lee,
Bottomly, B. (tweeds, etc.), Leicester.
Clappville Mills (flannels, &c.), "
Hodges, Sam'l L. (tweeds, etc.), "
Manhattan Manufacturing Co. "
Mann & Marshall (satinets), "
Field & Hubbard (satinets), Leverett.
Belvidere Manuf'ng Co. (flannels), Lowell.
Chase & Hosford, "
Faulkner & Brother, "
Middlesex Co., "
Blush, Oliver (satinets), Middlefield.
Church, S. U. & Brothers, "
Coogan, Michael (jeans), Millbury.
Kennison, Fowler & Mee (flannels), "
Murdock, George T. (satinets), "
Rhodes, John (satinet warp), "
Walling, Nelson (fancy cassimeres), "
Wood David (satinets), "
Hampden Manuf'g Co. (satinets), Monson.
Monson Woolen Manufact'ing Co. "
Monson & Brimfield Manuf. Co., "
Hodges, George & Son, N. Andover.
Stevens, Nathaniel & Son "
Sutton, Eben, (flannels), "
Ashworth, Thomas (shoddy), Oxford.
Buffum, Moses (black cassimeres), "
Chamberlain, McGaw & Co. (do.) "
Hodges, George, Jr. (flannels), "
Perry, D. & W. (yarn), "
Pittsfield Woolen Co. (cassim's), Pittsfield.

Pomeroy's, L. Sons (union cassim's and broadcloths), Pittsfield.
Pontoosuc Man'ing Co. (Balmorals), "
Russell, S. N. & C. (fancy cassimeres), "
Taconic Mills (union cassimeres), "
Barker, J. V. & Brother (cass'res), "
Hawkins & Co. (flannels), "
Peck & Kilborn (do.) "
Stearns, D. & H. (union cassim.) "
Streeter, Sereno C., Plainfield.
Lowe, Ralph (horse-blankets), Quincy.
Day, S. P. (satinets), Rowe.
Whitney, Day & Co., Royalston.
Salisbury Co. (doeskins, flannels, &c.), "
Prunker, E. & Co. (flannels), Saugus.
Scott, Francis & Son (flannels), "
Hunt & Varnum, Seekonk.
Cordaville Manuf. Co., Southboro.'
Hamilton Woolen Co., Southbridge.
Horton, N. M. & Co. (doeskins), S. Danvers.
Shorey, Thomas H. (satinets), Spencer.
Stanley, William (do.) "
Upham, William (do.) "
Glendale Woolen Co. (J. Z. Goodrich, agent), Glendale, Stockbridge.
French & Draper (hoods, glove-linings, &c.,) Stoughton.
Morrison & Southworth (yarns), "
Gleason, Benj. W. (flannels), Stowe.
Merman & Co. (satinets), Sturbridge.
Maynard, Amory (yarns), Sudbury.
Woodbury, Asa & Co. (jeans), Wilkinsonville.
Otter River Manufact'g Co., Templeton.
Tyasquin Mills (satinets), W. Tisbury.
Scott, Samuel W., Uxbridge.
Southwick & Sayles (cassimeres), "
Taft & Capron (satinets), "
Uxbridge Manufacturing Co., "
Wheelock, C. A. & S M. (cassim.), "
Shaw, Elijah (satinets), Wales.
Wales, R. P., (do.) "
Clarke & Wilmarth (yarn), S. Walpole.
Gilbert, G. H. & Co. (white, opera, and silk-warp flannels), Ware.
Stevens, Charles A. (flannels and tweeds), "
Knowles & Sibley (satinets), Warren.
Cooper, Hiram, (flannels), Watertown.
Slater, S. & Sons (broadcloths), Webster.
Schouler, John & Bros., West Cambridge.
Abbott Worsted Co. (worsted yarns), Graniteville, Westford.
Wood, David H., S. Westport.
Barwel, Seth (yarn), Whateley.
James, Henry L. (satinets), "
Stockbridge, C. D. (yarn), "
Ravine Mills, S. Wilbraham.
South Wilbraham Manufact'g Co., "
Calkins, D. A., Collins Depot, "
Nelson & Gates, (satinets), " "
Bodman, Lewis (satinets), Williamsburg.
Sears, Nathaniel (flannels), "
Bacon, John H. (wadding), Winchester.
Adriatic Woolen Mills (new), Worcester.
Bigelow & Barber, "
Fox & Rice, "
James, Benjamin, (shirts and drawers), "
Parkhurst, N. R., Valley Falls, "
Curtis, A., New Worcester, "
Lord, E. & Son (carpets), S. Wrentham.

Rhode Island.

Granite Woolen Mill, J. T. Seagrave & Co. (fancy cassimeres), Burrillville.
Steere & Tinkham (cassimeres), "
Smith, Jos. B. (satinets), Mapleville, "
Smith, G. N. & J. A. (new), " "
Whipple, Chas. H. (satinet)s, " "
Whipple, Dan'l S. (do.), " "
Whipple & Co. (do.), " "
Reynolds, Lafayette, Mohegan, "
Nichols, Jos. D. (satinets), Mohegan, "
Braman & Turner (do.) Pascoag, "
Emerson. Stephen, " "
Fiske, J. T., agent (satinets), " "
Inman, James O. (do.), " "
Sayles, Cook & Co., " "
Sayles, H. & Son, " "
Munyan & Mulliken (yarns and jeans), Phœnix, Coventry.
Bowen, Battey & Co. (kerseys), Cranston.
Harris, Edw. (doeskins, &c.), Woonsocket, Cumberland.
Paine, D. N. (satinets), "
Greene, James, Exeter.
Greene, William, Hopkinton.
Ashaway Manufacturing Co. (plaid linseys), J. R. Wells, ag't, Ashaway, "
Berry, H. S. (flannels), Woodville, "
Rodman & Sons, Newport.
Silver Spring Mill (kerseys), Allenton, N. Kingston.
Shady Lea Mill (beavers, blankets, &c.), W. B. Chapin, ag't, Allenton, "
Davis & Sweet (jeans, &c.) Davisville, "
Lafayette Mill, R. Rodman (jeans, &c.), Lafayette, "
Yorgo Mills, Wm. G. Rose, proprietor (jeans, &c.), Slocumville, "
Fisk, Stephen C. (kerseys), Peace Dale.
Peace Dale Manufac'ing Co. (broadcloths and shawls), "
Rodman, S. & Sons (kerseys), "
Bradford, Taft & Co., (cas'res), Providence.
Burrough, George A., "
Campbell, J. P. & J. M. (satinets), "
Chapin, Geo. W. & Co. (cassimeres), "
Cushing & Ellsworth (negro cloths), "
Day & Chapin, "
Draper, Lucian, "
Durfee, E. A. (kerseys), "
Elm Street Woolen Mill (cassimeres), William Hudson, agent, "
Evans & Seagrave (cassimeres.) "
Geneva Mill (cassimeres), Hale & Burrough, "

Valley Mills, Wm. Hudson (yarns and fancy hosiery), Providence.
Farnum, C. H. & Co. (jeans), "
Olney & Metcalf (cassimeres), "
Ross, John L. (cassimeres), "
Slater, S. & Sons, "
Spring Grove Mill (satinets), "
Wanskuck Co. (cassimeres), N. Providence.
Hyde, T. R. & Co. (do.) Carolina Mills, Richmond.
Weeden, Geo., agent, (linseys), Shamrock.
Kenyon & Sons (jeans), Shamrock.
Poke & Steere (cassimeres), Smithfield.
Wakefield Man'g Co. (satinets), Wakefield.
Greene & Howard (yarns), Warwick.
Babcock, E. & H., Westerly.
Brown & Co. (linseys), "
Stillman, Welcome, (plaid linseys), "
Stillman & Clark (do.), "
Stillman, O. W. & Co. (cassimeres), "
Weeden, J. E., agent, "
White Rock Manuf'ng Co. (linseys), "

Connecticut.

Lawton, William (satinets, etc.), Bethel.
Bristol Manuf. Co. (knit goods), Bristol.
Gaylord, William (satinets), Burlington.
Ensign, Sidney (satinets), Canaan.
Gladdell, William (satinets), Chester.
Coventry Satinet Manuf., S. Coventry.
Fargo, Horace (satinets), " "
Washington Mill (satinets, &c..) "
Union Manufacturing Co., Danbury.
Plumb, D. W. (beaver and broad cloths), Ansonia, Derby.
Alling, A. H. & C. B. (seamless hosiery and knit. yarns), Birmingham, "
Smith, O. F. (satinets), N. London, E. Lyme.
Broad Brook Manuf. Co. (fancy cassimeres), Broad Brook, E. Windsor.
East Windsor Woolen Co. (cass.), "
Plainville Manufac. Co. (shirts and drawers), Farmington.
Currier, And. J., Lord's Bridge, Franklin.
Lanman, Peter (hosiery), " "
Crosby & Hubbard (satinets), Glastenbury.
Eagleville & North Kingsbury Co., "
Noag Manuf. Co. (satinets), S. "
Whitlock, Augustus, Glenville, Greenwich.
Hopeville Manufacturing Co. (satinets), Jewett City, Griswold.
Lathrop & Co. (satinets), " "
Sayles, S. & L. (satinets), Killingly.
Carey, James C. (satinets), Lebanon.
Allen, E. & E. M. (flannels), Lisbon.
Rathbone, A. C. G., Hamburg, Lyme.
Hilliard & Spencer, Buckland, Manchester.
Pacific Company (C. G. Keeney), "
Charter Oak Manuf. Co. S. Manchester.
Otis Manufacturing Co. (stockinet), "
Thornton, Thomas (satinets), Middlebury.
Smith, O. F. & Co. (satinets), Montville.
Schofield, Charles F. (satinets), "
Vincent, Harry (cassimeres, &c.), "
Lewis, Thomas (satinets), Naugatuck.
New Britain Knitting Co. New Britain.
Wells Brothers (satinets), New Milford.
Beecher, Allen B. (satinets), Newtown.
Norfolk Woolen Co. (satinets), Norfolk.
Stillman & Clark, North Stonington.
Lounsbury, Bissell & Co. (felt cloth), Winnepank, Norwalk.
Union Manufac. Co. (felt cloth), "
Giles Manuf. Co. (worsted), Norwich.
Dimick, J. W. (carpet yarns), "
Elting, Wm. & Co. (flannels) "
Hale, F. M., "
Loomis, F. B. (cassimeres), "
Williams, E. (flannels), Yantic, Norwich.
Bradbury, J. & W. (satinets), Old Lyme.
Fitts, James (satinets), Orange.
Union Woolen Co. (doeskins), Plymouth.
Lucas, B. & Co. (flan.) Poquetonnoc. Preston.
Shelton, George P. (brocatelles), Seymour.
Saxony Woolen Co., Putnam.
Glover, E. N. (satinets), Ridgefield.
Washinee Co. (stocking-yarn), Salisbury.
Somersville Manuf. Co. (satinets), Somers.
Converse & Hyde, (satinets), Stafford.
Hydeville Manufac'g Co. (satinets), "
Converseville Co. (satinets), Parley Converse, agent, Stafford Springs, "
Fox, Charles & Co. (fancy cassimeres), Stafford Springs "
Mineral Springs Manufacturing Co., (satinets) Stafford Springs, "
Orcuttville Co. (satinets), "
Converse, Brother & Co. (satinets), Staffordville, "
Hope Co. (satinets), Staffordville, "
Staffordville Manuf. Co. (satinets), Staffordville, "
Converse, Jos. (satinets), W. Stafford, "
Capron & Co. (do.), Thompson.
Hartford Carpet Co., Thompsonville.
Sayles & Ross (satinets), W. Thompson
Enfield Manuf'ng Co, (drawers, &c.) "
Union Manufac'g Co., Torrington.
Pequot Company, Uncasville.
Phœnix Mills (Thomas Tyler). Vernon.
American Mills (cas's), Rockville, "
Florence Mills (mix'd does's), " "
Hockanum Co. (cassimeres), " "
Leeds, Co. (satinets), " "
New England Co., " "
Rockville Maunfacturing Co., " "
Saxony Co. (satinets), " "
Springvale Co. (satinets), " "
Stone Mill Co. (satinet warps, &c.), "
Talcott Brothers (satinets), Vernon Depot.
Potter & Dixon (negro cloths), Campbell Mills, Voluntown.
Waterbury Knitting Co. (merino shirts, etc.) Waterbury.
Kellogg & Co. (satinets), Wethersfield.
Sequassen Woolen Co. (cassi'es), Windsor.
Union Man'ng Co. (doeskins), Wolcottville.
Curtis, Daniel & Co. doeskins), Woodbury.
Dawson & Ward (cassimeres), "
Cockring, Larnard (satinets), Woodstock.
Hollingsworth, Jos. (cassimeres), "
Kenyon, Joseph (satinets), "

MANUFACTURES OF THE WEST.

In a country so recently settled as the Western States, and so abounding in all the elements that reward agricultural labor, one would not expect to find much development of the manufacturing arts; yet it appears that one-fifth of the aggregate product of manufactures in 1860 is to be credited to nine Western States, including, as such, Kentucky. It is, however, also true that much the largest proportion of this product was of the commoner and coarser articles, as flour, whiskey, lumber, etc., and that outside of the principal cities comparatively little progress has yet been made in the higher or artistic branches of manufactures. It is also a remarkable fact that there has been so little increase in the production of cotton and woolen goods within ten years, some of the Western States having reported a less value in 1860 than in 1850. Of the nine States, Ohio takes first rank in manufacturing importance, and next to New York, was the largest producer in the Union of Agricultural Implements and Flour and Meal. Illinois is also a large producer of agricultural implements, and in products of distilleries was second only to New York. Michigan is the leading State of the West in sawed and planed lumber; and Kentucky takes precedence over all the other Western States in the production of Woolen goods.

APPROXIMATE STATISTICS OF THE PRODUCTS OF MANUFACTURES IN THE WESTERN STATES FOR THE YEAR ENDING JUNE 1, 1860.

States.	Manufac'g Estabm'ts.	Capital invested.	Val. of Raw Material used, including Fuel.	Average No. of Hands Employ'd.		Value of Ann'l Product.
				Male.	Female.	
Ohio	10,710	$58,000,000	$70,000,000	69,800	11,400	$125,000,000
Indiana	5,120	18,875,000	27,360,000	20,600	710	43,250,000
Michigan	2,530	24,000,000	19,000,000	22,860	1,260	35,200,000
Illinois	4,100	27,700,000	33,800,000	23,500	870	56,750,000
Wisconsin	3,120	16,580,000	17,250,000	16,320	770	28,500,000
Minnesota	562	2,388,310	1,904,070	2,104	19	3,373,172
Iowa	1,790	7,500,000	8,500,000	6,475	102	14,000,000
Missouri	2,800	20,500,000	24,000,000	20,130	1,200	43,500,000
Kentucky	3,160	20,000,000	21,380,000	20,580	1,460	36,330,000
Kansas	299	1,063,000	669,269	1,719	....	2,800,000
Nebraska	107	266,575	237,215	334	2	606,058
Total in Western States...	34,298	$196,872,885	$224,100,554	204,422	17,793	$390,209,230

STATISTICS OF THE LEADING ARTICLES PRODUCED IN THE WESTERN STATES, INCLUDING KENTUCKY, IN 1860.

	1860.	1850.
Flour and Meal	$96,038,794	$42,673,992
Spirituous Liquors distilled, 44,746,193 gallons	10,927,591	
Malt Liquors brewed, 1,173,576 barrels	6,343,070	
Lumber, sawed and planed	33,274,793	14,577,250
Agricultural Implements	7,955,545	1,923,927
Pig Iron, 152,784 tons	3,777,200	
Bar and other Rolled Iron, 17,117 tons	1,332,000	
Machinery and Steam Engines	8,233,876	3,625,317
Iron Founding	5,170,984	3,839,967
Leather	5,986,457	5,281,351
Boots and Shoes	9,465,205	5,141,520
Furniture	6,674,839	3,960,993
Soap and Candles	5,607,187	1,836,808
Cotton Goods, 22 mills	1,642,107	1,269,403
Number of Spindles	43,926	
Number of Looms	1071	
Woolen Goods, 633 mills	4,359,842	3,940,084
Number of Spindles	22,979	
Number of Looms	476	

MANUFACTURES OF CINCINNATI, OHIO.

[In 1859 Mr. Charles Cist published a work on "Cincinnati as it is," in which he stated that the manufacturing industry of that city yielded a value of $112,254,400 annually. In 1860 the same Mr. Cist was one of the Assistant Marshals for the Eighth Census, and his return and those of his associates, when added, give for the whole of Hamilton County a product of $46,691,617. We cannot reconcile the discrepancy. We have no doubt whatever, knowing how negligent census officials are, that this return is below the truth, but we are equally confident that Cincinnati does not produce a hundred million of dollars yearly. The following are the returns for Hamilton County, for the year ending June 1, 1860, as reported to us from the Census Office.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Agricultural Implements	2	$18,000	$13,512	27		$33,200
Plows and Harrows	7	150,400	43,773	121		182,500
Reapers and Mowers	1	3 000	500	4		6,000
Alcohol	2	53,500	202,720	10		2 0,560
Baking Powders	2	20,150	11,155	8		25,750
Bellows and Forges	2	4,000	7,200	6		13,500
Billiard Tables	2	153,000	158,571	100		318,000
Blacking	1	2,000	7,000	15	5	20,000
Boat Building	11	166,500	102,768	232		265,214
Bolts, Nuts, &c	2	20,700	18,608	62		52 000
Boots and Shoes	285	402,100	558,018	1,573	172	1,392,943
Boxes, Packing	7	61,300	42,891	49		73,103
" Paper	1	10,000	8,000	20		20 000
Brass Founding	9	85,000	106,550	112		224,000
Bread and Crackers	85	90,265	352,822	256	8	600,430

CINCINNATI—*Continued.*

Manufactures.	No of Establishments.	Capital Invested.	Cost of Raw material.	Male hands.	Female hands.	Value of Annual Product.
Britannia Ware	2	47,000	81,980	43		84,000
Brooms	5	10,200	23,895	44		66,250
Brushes	8	26,450	36,065	79		71,810
Burning Fluid	1	6,000	6,500	2		8,000
Carpenters' Tools	1	2,000	6,340	10		25,000
Carpets	3	950	3,296	15		9,796
Carriages	27	178,612	172,844	447	1	484,450
" Children's	1	2,600	2,500	15		10,100
Cars	1	12,000	3,790	30		22,800
Car Wheels	1	50,000	40,000	20		75,000
Chemicals	4	141,000	86,000	48		165,260
Cigars and Tobacco	107	166,800	225,093	682		615,856
Clocks	1	600	300	1		900
Clothing	222	2,200,900	3,076,571	5,016	4,963	6,381,190
" Ladies' Cloaks, &c.	2	27,000	41,225	80		74,000
Coffee and Spices, Ground	4	101,2 0	412,520	52		519,300
Coffins, Metallic	1	80,000	84,300	60		153,000
Confectionery	18	67,850	155,219	80	31	240,302
Cooperage	96	81,250	130,665	572		896,442
Coppersmithing	5	83,650	45,305	21		77,565
Cordage	7	62,000	62,975	119		119,200
Cotton Goods	3	165,000	236,600	195	190	420,500
Cutlery	6	6,200	3,270	19		16,500
Drugs and Medicines	11	27,400	52,092	31		121,906
Dyeing and Printing	2	600	1,425	3		4,700
Fertilizers	1	1,500	2,000	4		6,400
Fire Arms	1	200	600	3		2,500
Flour and Meal	31	312,910	1,432,057	113		1,773,003
Flour Sacks	2	7,000	18,130	7		23,500
Furnaces, Heating	2	24,000	13,100	20		39,000
Furniture	48	1,032,886	559,516	1,840	43	1,830,136
" Bedsteads	4	199,400	103,170	332		377,570
" Chairs	18	352,000	77,766	406		352,685
Gas	1	1,047,350	52,660	200		302,000
Gas Fixtures	1	4,200	2,720	9		12,000
Gasometers, &c.	2	17,000	24,000	37		43,500
Glass-staining	2	8,000	10,000	10		17,000
Gloves, Buckskin	1	2,000	1,600	4	10	7,000
Glue	3	45,000	22,000	29		40,400
Gold Leaf	2	2,750	9,600	8		18,000
Grates	2	24,000	13,300	50		85,000
Hames	3	7,000	6,100	24		18,300
Hardware—Files	1	100	75	4		2,496
Bedstead Fasteners	1	6,000	1,440	3		7,040
Building and Saddlery	1	20,000	22,680	50		120,000
Planes	2	6,700	5,490	18		13,000
Squares, Bevels, &c.	1	2,000	2,000	8		7,000
Hats and Caps	20	73,000	91,742	60	50	199,432
Hosiery	8	9,500	10,955	19	13	25,950
Ink, Printing	1	1,000	1,988	1		3,600
" Writing	1	2,000	2,800	3	1	15,000
Instruments—Dental and Surgical	6	16,300	11,405	23		31,400
" Optical and Philosophical	3	17,500	4,000	13		16,000
Iron, Bar	1	120,000	140,000	120		200,000
" Founding	9	640,500	873,624	915		920,000
" Perforated	1	4,000	6,508	5		8,750
" Railing	4	24,100	76,815	104		168,785
Ivory, Black	1	5,000	2,000	6		6,000
Japanned Tinware	1	25,000	32,800	75		100,000
Jewelry	10	26,600	39,700	43		60,800
Ladders, Patent	1	2,000	7,500	4		12,500
Lead and Lead Pipe	1	25,000	50,000	5		90,000
Leather	31	570,300	699,141	311	1	1,093,941
Leather Belting and Hose	3	18,600	41,460	16		77,000
Lightning Rods	3	14,000	28,685	15		50,900
Liquors, Distilled	9	316,000	4 4,141	120		818,600
" Rectified and Manufact'd	48	517,600	2,350,947	173		2,837,809
" Malt	38	940,292	419,107	318	1	981,237
Lithography	1	10,000	12,500	28	1	85,000
Locksmithing and Bell-hanging	10	48,600	18,781	56		67,671
Looking-glasses & Picture Frames.	6	40,200	87,654	94		131,075
Lumber, Planed	5	131,000	288,420	123		400,520
" Sawed	18	253,100	310,250	177		488,937
Machinery, Steam Engines, &c.	39	1,057,200	810,294	1,414		2,081,300
Malt	3	40,000	115,800	19		164,000

CINCINNATI—*Continued.*

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Marble and Stone Cutting	28	164,300	209,497	479	......	850,550
Matches	1	27,000	29,605	50	16	122,000
Meats, Cured	32	1,488,600	4,006,145	818	......	4,542,465
Millinery	29	47,600	81,408	6	240	193,768
Mills, Portable	2	52,000	17,850	39	......	56,900
Millstones, Burr	2	8,000	4,500	12	......	16,000
Mineral Water	5	9,750	17,000	31	......	50,500
Morocco	3	2,100	8,[illegible]00	11	......	17,100
Musical Instruments	7	5,600	5,024	14	......	12,900
Nails, Wrought	4	900	1,715	13	......	7,[illegible]5
Oil Cloths	1	3,000	2,150	6	......	5,000
Oil, Coal	1	25,000	9,000	12	......	20,000
" Lard, and Candles	18	892,000	2,557,268	255	48	3,176,021
" Linseed	2	60,000	76,800	28	......	134,000
Paper, Printing	1	30,000	33,270	29	......	59,250
" Wrapping	3	82,000	42,300	24	......	102,000
Patterns	4	24,800	3,047	31	......	30,560
Photographs	16	46,600	13,380	51	12	80,660
Plaster Ornaments and Casts	5	1,450	2,400	10	......	10,400
Plumbing and Gas-fitting	14	41,300	68,054	79	......	147,810
Pocket Books	1	6,000	5,000	10	......	15,000
Pottery Ware	7	53,600	9,533	86	2	64,712
Printing	32	689,000	783,616	723	320	1,503,101
" Presses	1	15,000	6,400	25	......	23,500
Pumps and Blocks	3	3,000	1,250	9	......	7,675
Regalias	2	8,000	4,600	3	9	14,000
Roofing, Composition	1	2,000	7,545	10	......	12,000
" Metal	5	22,800	65,912	66	......	125,000
Saddlery and Harness	36	51,560	66,085	141	......	130,303
Saddle-trees	3	7,300	6,100	15	......	18,700
Safes, Fire-proof	3	91,000	59,160	145	......	200,000
" Provision	1	500	735	5	......	5,000
Sash, Doors, and Blinds	11	305,750	230,880	250	......	402,020
Saws	3	3,600	3,290	9	......	12,814
Scales	4	11,800	23,260	26	......	56,000
Seal Presses	2	14,000	5,500	8	......	24,000
Sewing Machines	14	39,000	61,108	113	......	216,905
Shirts	8	34,700	29,300	11	111	61,755
Shoemakers' Tools	1	1,600	4,500	2	......	8,000
Show Cases	3	5,100	12,000	14	......	24,000
Silk Fringes, Trimmings, &c.	4	11,300	14,300	11	14	41,200
Silver Ware	4	200,000	66,000	33	4	103,000
Silver Plate and Ware	2	13,200	3,720	14	......	15,500
Soap and Candles	3	11,200	15,58[illegible]	10	2	31,2[illegible]2
Sofa Springs	1	2,000	6,000	1	......	7,000
Spikes and Railroad Chairs	1	19,840	75,000	15	......	93,000
Spokes, Hubs, and Felloes	2	65,000	40,940	79	......	124,504
Starch	1	25,000	15,000	16	......	30,000
Stove Foundries	8	22[illegible],600	185,159	400	......	439,600
Terra Cotta Ware	2	11,750	2,845	16	......	18,000
Tin, Sheet Iron, and C. Ware	62	88,400	154,615	257	......	398,378
Trunks	9	64,800	86,347	223	......	242,800
Turnings and Mouldings	1	10,000	15,000	20	......	54,000
Turning and Scroll Sawing	9	6,600	6,025	31	......	24,555
Type and Stereotype Foundries	3	99,000	61,500	162	20	210,000
Umbrellas	2	10,000	10,614	9	5	31,450
Upholstery	17	73,700	120,403	95	57	245,698
Varnish	3	200,000	193,300	28	......	379,000
Venetian Blinds	4	3,000	10,550	18	6	20,700
Vinegar	14	16,700	35,547	17	......	67,512
Wagons, Carts, &c.	42	85,425	89,558	168	......	146,331
White Lead, &c.	3	110,000	238,252	103	......	305,500
Willow Ware	7	4,000	2,972	11	......	8,395
Wire Work	2	25,000	17,500	87	......	57,500
Wooden Ware	2	60,000	41,400	72	......	114,500
Woolen Goods	1	1,000	600	2	1	1,550
Wool Pulling	1	2,000	7,600	2	......	9,225
Total, including Miscell's Manufactures, not above specified,[1]	2,077	$18,887,693	$25,087,693	23,620	6,403	$46,691,617

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(1) Catawba wine, which is largely made in Cincinnati, is included in the Statistics of Agricultural Products, and not of Manufactures.

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MANUFACTURES OF CLEVELAND, OHIO.

[The following are the Statistics of Manufactures of Cuyahoga County, of which Cleveland is the capital, for the year ending June 1, 1860, as prepared for this work, at the Census Office, in advance of official publication.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Agricultural Implements	6	$19,400	$43,750	92		$170,500
Bags	1	3,000	15,000	4	5	21,067
Boots and Shoes	19	66,189	86,979	217	73	222,830
Brass Foundries	2	6,400	18,000	19		28,000
Bridges	1	15,000	50,840	50		104,000
Bricks	8	12,460	10,285	88		42,660
Brushes	1	5,000	500	18	3	4,700
Cabinet Furniture	13	81,400	28,578	138	4	71,500
Carriages	5	43,000	19,908	75		53,675
" Children's	1	1,400	855	5		4,000
Cars	1	25,000	20,000	30		50,0 0
Chairs	4	56,500	17,960	180		99,000
Cider and Vinegar	3	12,700	8,685	6		33,585
Cigars and Tobacco	4	8,700	8,500	13		28,105
Clothing	27	225,500	367,892	452	506	621,133
Confectionery	1	2,000	8,150	5	3	13,000
Copper Smelting	1	10,000	252,500	15		266,500
Cordage	1	3,000	2,000	6		5,000
Flour and Meal	21	220,200	896,448	74		1,008,126
Glue	2	15,000	5,740	7	1	63,400
Grindstones	6	77,000	10,900	115		58,000
Gunpowder	1	42,000	71,500	11		80,000
Hardware Tools	1	500	275	4		3,000
Files	1	1,500	1,000	10		5,000
Saws	1	4,000	9,000	5		13,000
Hats and Caps	5	22,100	15,600	5	16	24,590
Harness	11	16,400	17,981	35		41,649
Hosiery	1	800	1,000	2		2,000
Iron Foundries	5	77,800	35,150	55		74,170
Iron Railing	1	800	1,225	4		2,400
Iron Rolling	3	280,000	785,200	374		1,209,500
Leather	7	24,400	16,400	21		30,480
Lime	1	10,000	9,500	10		28,000
Liquors, Malt	15	143,000	83,067	79		191,205
" Rectified	6	23,600	102,100	16		131,273
Locomotive Lamps	1	10.000	3,800	7		6,625
Lumber, Planed	2	19,0 0	12,372	38		31,000
" Sawed	48	89,700	53,870	129		127,657
Machinery, Steam Engines, &c	17	151,400	142,854	274		318,947
Marble Work	4	27,500	24,350	79		92,500
Millinery	1	1,500	1,550		7	4.000
Mill Furnishing	2	5.000	10,000	12		35,000
Mineral Water	2	5,000	3,600	8		10,000
Morocco Dressing	2	6,500	7,450	17		16,500
Musical Instruments	3	4,200	1,389	6		11,050
Oil Cloth	1	5,000	4,950	9		20,000
Oil, Coal (Refined)	1	2,000	5,000	3		8,000
Pails and Buckets	2	45,000	81,250	140		14 ,000
Paints	2	5,500	1,780	3		7,000
Paper	3	132,000	98,800	88	16	193,350
Printing	10	245,4 4	89,087	174	11	257,334
Pumps	1	2 000	1,280	2		2,500
Sails	2	1,900	4,385	7		8,200
Sash, Doors, and Blinds	5	75,000	46,775	98		112 200
Scales, Platform	1	1,000	810	6		6.000
Sewing Machines	1	7.000	1,500	10		6.000
Shingles	11	13,250	14,315	29		28,445
Shoe Pegs, &c	1	9,000	1,500	11	4	15.000
Soap and Candles	9	55,500	181,683	52		2 0,540
Stoves	1	50,000	38.000	65		100,000
Tin, Copper, and Sheet Iron	14	41,000	70,488	73		136,281
Trunks	4	4,600	3,100	14		9,370
Wagons	6	5,800	4,225	24		13,600
Willow Ware	2	10,300	3,272	14	5	21,500
Wooden Ware	3	8,000	4,545	15		24,719
Total, including Miscell's Manufactures, not above specified,	383	$2,676,963	$4,028,315	3,794	661	$6,967,737

MANUFACTURES OF CHICAGO, ILLINOIS.

[The following are the Statistics of Manufactures of Cook County, of which Chicago is the capital, for the year ending June 1, 1860, as prepared for this work at the Census Office, in advance of official publication.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Product.
Agricultural Implements:						
Miscellaneous	1	25,000	6,000	27	......	35,000
Mowers and Reapers	1	500,000	96,210	200	......	414,000
Threshing Machines	2	137,000	15,890	67	......	80,000
Alcohol	2	17,500	333,780	10	......	520,000
Blacksmithing	9	18,050	7,210	27	......	30,150
Boat Building	2	2,500	1,505	8	......	3,700
Bone Black	1	3,000	990	10	......	3,500
Book Binding, &c.	1	1,000	3,330	4	3	9,360
Boots and Shoes	66	75,800	95,543	253	3	216,231
Boxes, Packing	5	24,000	42,045	70	......	86,040
Boxes, Paper	2	4,500	2,050	6	2	5,000
Brass Founding	6	54,000	51,490	98	......	138,000
Bread and Crackers	11	121,800	238,364	119	9	391,668
Brick	5	96,700	15,795	266	......	139,200
Brushes	1	200	145	2	......	600
Cabinet Furniture	18	83,750	68,311	209	3	247,863
Camphene	1	6,000	180,325	2	......	190,000
Carpentering	10	15,250	34,390	50	......	72,975
Carriages	25	253,000	56,595	188	......	213,070
" Children's	1	6,000	1,480	4	......	11,100
Cars	3	130,000	37,500	82	......	82,000
Car Wheels	1	10,000	43,560	8	......	56,000
Cigars	6	6,650	12,285	22	......	65,715
Cisterns	1	1,000	1,000	3	......	3,100
Clothing	28	115,600	331,446	321	82	545,400
Coffee and Spices	3	62,000	158,090	27	......	192,700
Coffins	4	9,200	3,984	7	......	12,000
Confectionery	5	15,000	84,400	26	......	143,950
Coopering	29	205,450	77,723	243	......	178,765
Copper Smithing	1	250	460	1	......	1,100
Cotton Bags	1	1,000	70,000	6	8	90,000
Cotton Batting	1	1,200	10,000	5	......	15,000
Engraving	2	3,300	2,150	12	......	12,500
Flour	8	193,000	970,550	78	......	1,135,125
Gas	1	768,000	60,000	140	......	245,000
Gas Fittings	1	7.000	2,000	13	......	15,000
Glue and Oil	2	12,500	57,600	60	......	80,840
Hardware—Files	1	2,000	1,062	3	......	4,320
Hats and Caps	4	10,400	10,930	12	4	24,750
Hay Pressing	1	25,000	......	22	......	13,000
Iron Founding	6	129,000	89,675	96	......	221,000
Iron, Rolled	1	200,000	445,000	195	......	660,000
Iron Work, Ornamental	1	2,000	1,950	10	......	6,000
Ivory Turning	1	1,000	2,600	1	......	3,200
Jewelry	5	4,800	15,257	10	......	27,000
Leather	3	31,500	16,620	12	......	26,628

CHICAGO—*Continued.*

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Product.
Lime	1	$18,000	$9,960	10	......	$37,822
Liquors, Rectified	6	92,000	119,360	37	......	271,480
Liquors, Malt	14	438,500	214,832	140	......	572.240
Liquors, Bottled	1	10,000	27,000	6	......	40,000
Champagne	1	60,000	110,300	86	......	216,000
Lightning Rods	1	10,000	5,100	12	......	20,000
Looking-glass and Picture Frames	2	2,500	1,290	6	......	4,800
Lumber, Planed	6	40,000	356,875	74	......	417,828
Malt	1	2,000	9,240	2	......	10,250
Machinery, &c.	16	346,000	249,034	597	......	582,500
Marble and Stone Cutting	4	177,000	131,000	182	......	227,000
Masonic Regalia	1	1,000	4,500	1	4	7,000
Matches	2	1,800	487	6	......	4,375
Mattrasses	1	800	840	1	......	1,280
[1]Meats, Cured	1	10,000	6,000	2	......	10,000
Millinery	12	26,600	72,075	8	72	183,400
Mineral Water	1	3,000	10,000	5	......	13,000
Morocco	1	10,000	20,000	7	......	34,000
Musical Instruments, Pianos	2	15,500	7,050	7	......	23,600
Plaster Work (Ornamental)	2	1,400	2,380	10	......	9,000
Painting	4	4,500	4,531	19	......	22,805
Pottery-ware	1	300	250	1	......	1,000
Printing and Publishing	19	307,700	190,716	351	5	525,022
Rope and Cordage	1	100	1,340	3	......	2,500
Saddlery and Harness	18	26,625	21,681	52	......	56,707
Sash, Doors, and Blinds	18	188,800	124,164	278	......	373,247
Scales	1	5,500	945	10	......	10,000
Sewing Machines	2	2,800	446	4	......	3,050
Shingles	4	35,000	27,300	72	......	61,000
Shirts	3	1,600	7,964	1	26	23,581
Silver Ware	1	20,000	25,520	9	......	34,000
Silver Plated Ware	1	2,000	2,500	6	......	11,000
Soap and Candles	11	48,300	121,337	43	......	242,680
Staves	1	5,500	14,000	12	......	32,500
Sugar Refining	1	13,000	727,000	75	......	860,000
Tin and Sheet Iron Ware	10	20,150	22,002	28	......	37,983
Trunks and Valises	3	15,000	14,616	26	......	47,620
Type Founding	1	25,000	6,210	10	6	24,600
Upholstering	2	350	400	2	......	1,320
Vinegar	2	3,000	6,000	4	......	12,840
White Lead	2	24,000	153,000	29	......	233.000
Wigs and Hair-work	2	3,000	4,600	7	......	18,700
Wood Turning, &c.	3	2,500	1,260	4	......	4,800
Total	467	$6,420,725	$6,591,445	5,225	228	$11,944,229

(1) Pork and Beef Packing, except the above small establishment, not returned by Marshals. There are fifty packers, whose annual product in 1859–60 was about five millions, making the whole value of products of industry in Cook County nearly $17,000,000.

MANUFACTURES OF DETROIT, MICHIGAN.

[The following are the Statistics of Manufactures of Wayne County, Michigan, of which Detroit is the capital, for the year ending June 1, 1860, as prepared for this work at the Census Office, in advance of official publication.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Agricultural Implements	8	$27,000	$10,043	46	......	$36,268
Baking Powder	1	600	6,040	1	......	870
Blacksmithing	25	15,350	10,672	58	......	39,487
Blocks and Spars	1	4,000	7,000	5	......	15,200
Boots and Shoes	35	42,000	52,758	132	......	125,703
Bread	11	10,000	63,396	39	......	99,206
Bricks	16	56,610	10.942	263	......	96,960
Brooms	1	500	4.000	3	......	6,250
Carpentering	5	9,300	10,512	45	......	37,228
Carriages	3	3,000	4,151	16	......	12,706
Charcoal	1	100	75	2	......	540
Churns (patent)	1	2,000	450	4	......	5,400
Cigars and Tobacco	1	2,300	6,000	3	......	7,060
Clothing	11	36,900	43,530	51	42	77,800
Coffins	1	4,000	1,800	3	......	6,000
Coopering	8	36,400	11,027	90	......	48,115
Copper smelting	1	100,000	1,821,000	40	......	1,500,000
Cordage	2	1,800	2,195	5	......	3,720
Cutlery and Edge Tools	1	1,500	2.114	4	......	7,000
Fisheries	5	57,144	3,108	103	......	30,798
Fish Nets	1	100	2.132	......	25	5,000
Flour	15	109,300	274,821	35	......	313,837
Furniture	12	55,125	25,451	121	......	67,296
Furs	1	47,700	75,000	48	......	143,000
Glue and Varnish	1	400	4,599	8	......	16,100
Gold Pens	1	2,000	510	3	......	2,800
Gun making and repairing	2	3,000	2,950	9	......	8,000
Hats	3	4,100	5,660	5	8	17,425
Ice	2	3.800	5,800	9	......	13,600
Iron, Bar and Railroad	1	232,000	323,300	300	......	586,000
Iron Forging	1	20,000	3,900	12	......	5,000
Iron Founding	3	58,000	42,905	66	......	92,900
Iron, Pig	2	210,000	77,972	120	......	145,000
Jewelry and Silver Ware	1	1,200	3,000	3	......	4,500
Leather	9	233,000	242,945	108	......	380,225
Lime	4	43,000	10.475	16	......	21,638
Liquors, Malt	21	225,150	113,604	93	......	301,163
" Spirituous	1	500	1,600	2	......	3,200
Lumber, Sawed	43	901,950	348,701	466	......	619,049
Machinery, Steam Engines, &c	12	1,152,500	228,361	505	......	608,478
Marble Cutting	5	31.500	23.100	45	......	50,900
Melodeons	1	10,000	1,200	15	......	15,000
Milk Safes	1	2,000	600	7	......	4,500
Millinery	1	1,000	500	......	3	1,800
Morocco	1	4,000	1,100	5	......	19,000
Peppermint, Distilled	1	200	275	4	......	690
Pianos	1	5,000	852	4	......	5,000
Picture Frames	1	1,000	240	3	......	2,800
Plaster Ornaments	1	500	50	1	......	750
Potash	8	8,975	11,365	26	......	35,020
Pottery Ware	2	2,425	1.445	11	......	12,475
Printing and Publishing	3	102,000	87,000	135	......	136,400
Saddlery and Harness	5	2,500	6,091	10	......	10,716
Sashes, Doors, &c	10	41,007	27,697	157	......	128,929
Saws and Files	1	8,000	40,850	20	......	79,000
Shingles	5	1,850	1,710	9	......	3,800
Ship and Boat Building	3	66,980	29,800	65	......	71,100
Shirts	1	500	990	4	......	1,650
Shoe Findings	1	4.000	2,695	10	......	12,000
Soap and Candles	4	52,700	95,495	52	......	137,915
Stone Quarrying	1	10,000	......	25	......	5.000
Sugar Boxes	1	1,500	100	4	......	1.200
Tin Ware	12	35,400	34,905	43	......	82,950
Tress Hoops	1	1,000	300	4	......	1,600
Wheelwrighting	16	18,200	7.003	52	......	37,005
Wool Carding	1	1,700	2,000	2	......	2,400
Wool Pulling	1	10,000	18,500	10	......	26,000
Total	363	$4,132,266	$3,711,512	3565	78	$6,400,043

MANUFACTURES OF ST. LOUIS.

[The following are the Statistics of Manufactures in St. Louis county, Missouri, for the year ending June 1, 1860, as prepared for this work at the Census Office.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands	Value of Annual Product.
Agricultural Implements	3	55,000	67,513	63		123,200
Alcohol, Camphine, &c.	3	39,000	160,050	10		187,596
Bags	1	8,000	71,500	6		76,000
Bakers' Bread	26	40,100	110,517	64		190,230
Baskets	11	710	350	17	16	8,950
Billiard Tables	1	4,000	3,200	2		8,000
Blacksmithing	22	23,275	24,372	69		71,060
Blocks and Pumps	1	2,500	350	2		2,850
Bookbinding	4	7,500	7,974	14	3	15,100
Boots and Shoes	167	149,215	161,658	501	30	452,581
Boxes, Packing	2	2,700	9,550	16		24,000
" Paper	3	1,400	1,274	6		5,355
Brass and Bell Founding	7	38,500	21,062	80		110,020
Brick	50	206,700	99,066	1,213		629,700
Brooms	3	2,600	3.175	9		7,125
Brushes	2	16.000	4,700	34		24,000
Carpenters' Tools	2	3,000	2,245	6		6,100
Carpentering	28	113,000	259,900	386		542,778
Carriages	5	70.500	27,538	98		123,050
Cars	2	38,000	100.100	60		188,000
Carving	2	700	660	2		2,700
Chemicals	1	90 000	27.250	18		86,000
Cigars	57	98,210	114,075	278	3	354,273
Clothing	148	306,880	406,631	585	261	839,575
Coffins	2	2,350	2,205	6		8,325
Confectionery	5	15,200	71,147	39	3	109,685
Coopering	48	58.700	120,140	378		475,589
Cotton Goods	2	169.000	110,000	85	85	280,000
Cow-bells	1	4,000	2,250	5		11,000
Dentistry	1	1,000	4,550	4		10,000
Drugs and Medicines	6	51,100	68,190	48		116,000
Engraving	2	1,600	900	10		4,000
Flour and Meal	18	999,000	4,269,680	239		4,979,845
Furniture	31	93.650	47,304	139		153,167
Gas	1	600,000	46.750	60		416,306
Gas Fittings	3	47,600	25,250	34		58,200
Glass Ware	2	59.000	27,300	140		282,000
Grates, Enamelled	1	1,000	4,375	3		8,000
Hair-work	4	10.000	4,150	12	3	21,200
Hats and Caps	10	34.550	14.866	25	8	43,670
Hosiery	2	11,000	8,200	10		14,880
Ice	1	10.000	200	15		25,000
Ink	1	3,000	555	4		1,500
Iron Forging	2	47,000	29,980	27		70,000
" Founding	6	177,000	174,010	217		347,000
" (Stoves)	4	785,000	278,500	462		810,960
" Machinery	23	1,071,900	595.070	1,332		1,509,110
" Pavements	1	5.000	16,032	25		49,500
" Rolled	2	275,000	132,952	125		335,000
" Railing	3	2.350	1,830	9		8,160
Jewelry	9	17,750	15,500	22	5	40,336
Lamps	1	2,500	1,543	5		6,050
Lead	1	75,000	100,600	12		130,000
Leather	9	108,100	165,280	76		311,250
" Currying	2	3.500	5,644	4		8,400
" Belting	1	15.000	25,000	6		32,500
Lightning-rods	1	1.200	2,537	4		4,800
Lime	6	39.800	39,400	93		151,450
Lithography	1	1,000	134	4		900
Locks	3	830	1,126	6		6,975
Malt	1	80,000	15,000	12		27,000
Marble	6	55,000	50,900	175		167,037

ST. LOUIS—*Continued.*

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Matches	1	$100	$75	2	1	$900
Mathematical Instruments	1	2,700	1,200	3	......	4,000
Malt Liquors	35	705,800	427,110	258	......	1,155,600
Mills, Portable	1	25,000	10,450	......	......	25,000
Millinery	9	17,150	26,228	5	......	88,460
Mustard	2	17,000	30 970	11	......	72,000
Oil, Coal	1	30.000	50,000	9	......	86,000
" Lard	1	100.000	120.000	10	......	125,000
" Cotton Seed	1	40,000	43,000	30	......	66,800
Organs	2	11,500	3,600	12	......	14.000
Perfumery	1	1,000	600	1	......	1,800
Pianos	4	3.300	2,079	4	......	8,900
Picture-frames	1	23.000	18.000	12	......	26.000
Planed Lumber	4	85,000	78,000	95	......	151,000
Plumbing	1	7,370	10,395	16	......	35.000
Pork, Packing	7	1,090,000	1,255,629	264	9	1,657,646
Pottery	2	2,700	205	5	......	5,000
Printing	6	83,000	61,552	130	......	195,954
Rope and Bagging	14	474,130	1,029,100	277	157	1,189,018
Roofing	8	47,500	17,175	23	......	37,800
Saddle-trees	3	3.000	3,955	39	......	27,428
Saddlery	32	102.350	132,823	208	2	330,244
Saws	2	53,000	30,800	29	......	57.000
Safes	1	15.000	39,205	25	......	66,000
Sashes, Doors, and Blinds	7	124,000	121,495	214	......	304,847
Sawed Lumber	16	372,088	260,938	150	......	453,820
Scales	2	6,000	1,865	12	......	17,000
Show-cases	1	5,000	2,200	5	......	10,000
Sausages	11	3,500	3,820	12	......	11,420
Shirts	3	1,900	3,572	......	18	18,893
Silver-plating	1	3,000	1,800	7	......	11,000
Silver-ware	2	22,500	50,900	31	......	75,000
Soap and Candles	10	596,800	1,254,778	232	55	1,586,280
Spokes and Hubs	1	140,000	67,500	80	......	160,000
Spices (ground)	1	30,000	25,600	15	......	60,400
Stair-building	2	600	344	4	......	2,050
Steamboat-building	3	12,000	18,805	37	......	45,825
Stone-quarrying	30	92.300	3,231	223	......	227,376
Stucco-work	2	1,500	1,100	4	......	19,000
Sugar-refining	1	1,000,000	1,469,000	216	......	1,800.000
Tents and Awnings	1	3,000	4.000	4	4	6,000
Tin and Sheet-iron Ware	43	179,740	158,034	186	......	322,825
Tobacco	6	109,700	143,693	279	12	263,799
Trunks	3	42,500	8,985	40	......	46,000
Trusses	2	4,500	1,381	5	4	8,600
Trimmings	2	108,000	237,000	55	......	311,800
Turning	3	3,000	3,725	11	......	10,357
Upholstery	6	36,950	56,450	40	42	126,970
Vinegar	7	14,500	38,443	11	......	61,760
White Lead	3	158,000	270,500	65	......	351,500
Whips	2	700	1,200	5	......	4,500
Wooden-ware	1	75,000	47,500	60	......	150,000
Wool-carding	1	500	750	1	......	1,000
Wagons, Carts, &c	41	118,600	71,773	215	......	265,710
Total	1,125	$12,636,503	$15,905,012	11,352	752	$27,[illegible]

MANUFACTURES OF THE SOUTHERN STATES.

[When this work was projected, the plan included a detailed and minute account of the progress that had been made in establishing manufactures in the Southern States. The Hon. Jefferson Davis, then a Senator in the United States Congress, employed a gentleman in Mississippi to report upon the development of manufactures in that State; but the only report that was ever received from him was a letter of inquiry. The Hon. Alexander H. Stephens addressed a letter, giving all the information that he possessed in relation to the manufactures of Georgia; which, however, was so little, that the letter is not worth publishing. Since then, there has been so much interruption in the postal arrangements, that it is difficult to communicate with these correspondents; and as several hundred thousand men, well armed, have tried for three years to visit Richmond, and have not succeeded, our readers will excuse us from attempting a personal visit, and be content with the information, meagre as it is, furnished in the Census returns.]

MANUFACTURES OF BALTIMORE, MD.

[We perhaps owe an apology to the citizens of Baltimore and Wilmington, for placing in this connection the statistics of their enterprise, which has more Northern than Southern characteristics; but we received the information from the Census Office too late for insertion in their proper place.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Agricultural Implements	4	$248,000	$85,450	232	......	$233,500
Blacksmithing	11	12,950	11,047	60	......	37,680
Boots and Shoes	240	211,685	355,737	1,038	252	871,567
Baker's Bread ond Crackers	68	72,135	277,722	184	9	469,585
Brass Foundries.	5	76,000	97,469	85	......	154,000
Bichromate of Potash	1	70,000	100,300	50	......	135,000
Bricks	37	124,800	72,595	365	......	278,600
" Fire	1	5,000	7,500	30	......	18,000
Brooms	3	34,300	47,128	93	......	63,358
Boxes	3	5,800	12,900	23	......	27,300
Blocks and Pumps	6	4,000	2,980	15	......	12,450
Carriages	10	68,300	116,916	117	......	217,925
Clothing	119	1,218,500	1,837,293	2,189	3,672	3,124,081
Confectionery	12	20,700	43,587	20	2	73,988
Copper, Tin, and Sheet Iron Ware	37	88,500	106,826	205	......	282,030
Carpets	6	16,050	6,296	12	......	11,365
Cloaks and Mantillas	4	12,200	17,450	1	41	23,425
Copper Smelting	1	600,000	1,050,000	150	......	1,300,000
Cooperage	22	94,200	154,720	431	......	319,095
Cotton Goods	1	10,000	32,500	150	......	50,000
Chemicals	1	12,000	12,000	20	......	30,000
Cordage	4	33,400	45,436	58	......	66,490
Drugs and Dye Stuffs	1	43,450	52,900	40	......	82,148
Doors, Sash, and Blinds	4	13,700	8,910	14	......	23 840
Etherial Oil	3	3,400	12,950	6	......	27.368
Earthen Ware	6	42,200	17,467	80	......	54,138

BALTIMORE—*Continued.*

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw Material.	Male hands.	Female hands.	Value of Annual Product.
Flour and Meal	5	$72,000	$548,550	51		$620,692
Furniture	88	266,400	193,489	435	85	534,910
Fringes, Laces, &c.	8	85,800	18,121	22	13	39,890
Fruits, Preserved	4	26,500	34,500	15	56	63,700
Fire Arms	3	12,000	3,019	19		31,000
Gas	1	1,100,000	132,000	230		375,000
Hoop Skirts	2	2,500	2,674	2	6	11,250
Hats and Caps	18	60,846	57,626	76	35	145,047
Horse Shoes	4	1,300	3,401	13		13,983
Iron, Bar, and Sheet	2	225,000	365,777	815		641,125
" Founding	10	827,500	186,412	401		589,000
" Pig	2	100,000	89,000	76		130,000
Lumber, Planed	7	106,000	284,950	155		334,779
" Sawed	2	70,000	25,600	22		66,250
Locomotives	1	137,000	13,500	60		50,000
Leather	14	335,100	345,165	99		471,010
Liquors, Distilled	2	70,000	117,300	18		142,000
" Malt	12	86,900	108,288	101		211,161
" Rectified	9	13,200	79,786	15		124,867
Mathematical and Surg. Instr'nts	2	9,000	1,500	12		30,000
Machinery	8	185,800	155,925	345		392,500
Morocco Dressing	3	14,000	56,850	49	5	81,719
Marble Work	11	93,900	110,090	189		229,760
Mill-wrighting	1	4,000	5,000	6		10,000
Mirrors and Gilt Frames	4	17,900	15,045	19		34,200
Mustard and Vinegar	5	2,900	3,432	9	1	11,020
Nails, Horse-shoe	3	2,500	4,095	9		13,300
Nuts and Bolts	3	9,800	9,450	14		23,460
Oil, Linseed	1	100,000	178,000	20		233,000
Oysters, Packed	25	652,434	529,130	1,247	451	1,025,920
Organs	1	3,600	3,800	7		12,000
Printing and Publishing	7	201,000	114,178	204		324,954
Paper, Printing	1	4,000	13,000	12		30,000
Paints	4	3,500	8,465	8		24,055
Piano Fortes	4	117,600	119,900	187		265,000
Plumbing	4	22,100	20,200	42		50,300
Pork Packing	5	187,680	748,250	65		928,235
Scales	1	20,000	1,500	8		10,000
Sugar, Refined	1	250,000	2,200,000	175		2,300,000
Soap and Candles	10	143,700	346,643	71		433,845
Saddles and Harness	23	75,700	70,392	156	6	210,491
Ship and Boat Building	16	305,600	251,350	442		606,822
Shipsmithing	5	7,600	9,113	24		32,250
Sail Making	7	11,200	66,600	46		126,400
Shirts	2	7,500	27,075	5	48	35,000
Silver Ware	1	20,000	20,000	15		30,000
Shot	1	42,463	46,226	7		56,480
Tobacco and Cigars	129	226,850	254,703	516	1	706,649
Upholstery	4	11,500	27,200	33	20	47,045
Wheelwrighting	11	12,400	11,194	52		39,185
Wire Work	4	5,000	5,040	20		23,100
Total, including Miscell's Manufactures, not above specified,	1,100	$9,009,107	$12,624,737	12,888	4,666	$21,083,517
Aggregate of Baltimore County	1,310	$13,789,757	$18,068,683	15,925	5,907	$29,591,753
Aggregate of State of Maryland	3,083	$23,230,608	$25,494,007	21,937	6,766	$41,735,157

Increase since 1850, per cent. 26.3.

MANUFACTURES OF WILMINGTON, DELAWARE.

[Between Philadelphia and Baltimore, about twenty-eight miles from the former place, is the important manufacturing town of Wilmington, Delaware. We are informed by Joseph Lea, Esq., of Philadelphia, that there is now in the possession of Edwin Mitchell, of the same city, a sample of calico which was made in Wilmington before 1795, by a French Marquis, and which is a highly creditable specimen of calico printing. At the present time there are several very important manufacturing establishments in Wilmington and its vicinity, including Dupont's Powder-mills, Harlan & Hollingsworth's Car-works and ship-yards, Lobdell's car-wheel works, Betts' Engine and boiler-works, Pennock's Agricultural implement works, and others.

The following are the Statistics of Manufactures of New Castle County for the year ending June 1, 1860, the greater part belonging to Wilmington.]

Manufactures.	No. of Establishments.	Capital Invested.	Cost of Raw material.	Male hands.	Female hands.	Value of Annual Product.
Agricultural Implements	7	38,500	20,878	62		63,571
Axles	3	10,500	5,855	17		15,650
Bolts, Nuts, &c.	1	8,000	20,100	17		30,640
Bone Dust	1	3,000	3,950	3		5,713
Boots and Shoes	42	79,975	85,853	223	54	196,241
Brass-founding	3	12,000	7,225	7		10,225
Bread and Crackers	4	19,500	56,780	26	4	80,300
Brick	4	59,000	17,650	210		73,000
Cabinet Furniture	13	60 100	21,707	53	4	49,347
Cars	1	50,000	54,500	100		100,000
Car Springs	1	8,000	15,775	18		24,750
Carriages	16	204,850	236,260	522	1	553,250
Cigars	8	10,000	20,410	52		44,030
Clothing	19	68,675	100,708	62	167	177,340
Confectionery	2	11,000	16,130	9	4	27,460
Cotton Goods	11	582,500	590,102	520	589	941,703
Drain Tile	1	6,000	1,625	8		6,300
Fire Brick	1	4000	1,500	3		15,000
Flour and Meal	30	471,762	1,297,061	92		1,537,296
Gunpowder	1	500,000	358,640	225		600,000
Horse-shoe Nails	1	100	935	3		2,496
Hoop-skirts	1	2,000	809	2	3	4,125
Iron-founding	5	312 000	436,090	264		658,750
Iron, Rolled	4	190,000	112,254	83		192,600
Leather	5	122,900	168,066	51		237,080
Leather Hose and Belting	1	100	4,500	1		5,500
Machinery, Steam-engines, &c.	6	237,000	186,650	325		348,600
Machinists' Tools	1	30,850	7,199	22		22,142
Malt	1	7,000	11,650	3		15,000
Masts and Spars	1	1,000	2,000	3		4,176
Metallic Kegs	1	5,000	8,000	12		15,000
Morocco	7	160,000	329,962	204	32	461,650
Paper	2	280,000	286,439	66	27	385 000
Patent Leather	1	95,000	111,400	100		190,750
Plaster, Ground	2	4,800	4,945	6		7,600
Pottery-ware	3	7,300	2,615	12		12,167
Quercitron Bark	1	2,000	4,800	2		8,100
Sails	1	1,000	4,130	3		6,530
Saddlery and Harness	7	32,225	22,078	40		48,245
Sashes, Doors, and Blinds	4	34,000	11,886	27		29,436
Sewing-machines	1	10,000	2,875	15		15,000
Ship-building	6	293,500	327,300	558		574,650
Ship-smithing	3	5,000	5,300	12		18,925
Shirts	1	2,000	1,295	1	8	4,250
Snuff	2	25,000	11,600	12		47,200
Soap and Candles	1	25,000	24,730	8		41,500
Spokes and Felloes	1	16,000	7,000	14		12,000
Spices, Ground	1	60,000	40,000	8	2	60,000
Stone and Marble-cutting	3	17,700	14,755	18		25,900
Tin, Sheet-iron, and Copper-ware	10	49,300	40,069	61		79,796
Turning	3	3,500	9,850	12		16,068
Wool-carding	2	1,000	3,000	3		3,600
Woolen Goods	4	117,000	75,807	76	38	153,035
Total, including Miscell's Manufactures, not above specified.	381	$4,862,472	$5,513,066	4,765	948	$8,914,441
Aggreg. of State of Delaware in 1860,	616	$5,451,887	$6,028,918	5,421	956	$9,843,902
" " " 1850,	531	$2,978,945	$2,864,607	3,237	651	$4,649,296

APPROXIMATE STATISTICS OF THE PRODUCTS OF MANUFACTURES IN THE SOUTHERN STATES FOR THE YEAR ENDING JUNE 1, 1860.

States.	No. of Estabm'ts.	Capital invested.	Val. of Raw Material used.	No. of Hands Employ'd. Male.	Female.	Value of Ann'l Product.
Virginia	4,990	$26,640,000	$30,880,000	33,050	3,540	$51,300,000
North Carolina	2,790	9,310,000	9,860,000	11,760	2,130	14.450,600
South Carolina	1,050	5,610,000	8,620,000	6,000	800	6,800,000
Georgia	1,890	11,090,875	9,986,532	9,511	2,064	16,925,564
Florida	185	4,344,225	874,506	2,297	157	2,547,969
Alabama	1,459	9,098,181	5,489,963	6,822	1,097	10,588,571
Louisiana	1,710	7,110,000	7,380,000	7,610	80	15,500,000
Texas	910	3,850,000	2,770,000	3,360	110	6,280,000
Mississippi	860	3,740,000	2,460,000	4,540	150	6,000,000
Arkansas	518	1,316,610	1,280,503	1,831	46	2.880,578
Tennessee	2,420	17,270,000	9,365,000	11,960	1,135	17,100,000
Total in Southern States.	18,682	$99,379,891	$83,966,504	98,741	11,309	$150,312,682

STATISTICS OF THE LEADING ARTICLES PRODUCED IN THE SOUTHERN STATES IN 1860.

	1860.	1850.
Lumber, sawed and planed	$17,941,162	$8,846,476
Flour and Meal	30,767,457	16,381.917
Leather	4,074,406	3.577,579
Boots and Shoes	2,729,327	1,491,944
Agricultural Implements	1,582,483	784,452
Pig Iron, (Virginia and Tenn.,) 27,518 tons	708,173	
Bar and other Rolled Iron, 24,176 tons	1,748,371	
Machinery and Steam Engines	4,060,808	838,284
Iron Founding	2,504.362	1,587,900
Spirituous Liquors distilled, (299 Distilleries,)	715,487	
Cotton Goods, 158 mills	3,104,587	5,665,362
Number of Spindles (cotton)	290,859	
Number of Looms "	6,713	
Woolen Goods, 294 mills	2,603,855	1,108,811

Virginia was the leading manufacturing State of the South, and produced two-thirds of the bar and other rolled iron, one-third of the steam-engines and machinery, and one-half of all the Flour and Meal made in the Southern States. The Saw-mills were located chiefly in Virginia, Georgia, Alabama, and Mississippi, though each of the States produced sawed and planed lumber to an amount exceeding a million of dollars. The Tanneries were located principally in the States of Virginia and Tennessee, the production of leather being nearly equally divided between them. Louisiana made over one-half of the Boots and Shoes, and Alabama one-half the Agricultural implements, though her production consisted principally of cotton-gins. Pig iron was made only in the States of Virginia and Tennessee, the former producing 9096 tons, and the latter 18,417 tons; but as it is known that there are charcoal furnaces in other Southern States, this is probably an error of the census officials. The Foundries were located chiefly in Virginia, Tennessee, and Louisiana, and the Distilleries in North Carolina, Virginia, Tennessee, and South Carolina.

Of the 158 Cotton mills, the largest number in any one State (38) were located in North Carolina; but 33 mills in Georgia having 85,186 spindles, 2041 looms, produced nearly one-third of the whole production of the Southern States. Of the 294 woolen mills, Virginia had 108, Tennessee 70, Georgia 30, North Carolina 28, Alabama 16, Texas, Mississippi, and South Carolina, 10 each, Arkansas 11, and Louisiana 1.

The South is now passing through the ordeal by fire, but will come forth, like iron from the furnace, strengthened and purified. A new, intelligent, and enterprising people will take possession of her desolated fields; and the day is not distant when many a stately edifice will be musical with the clanging of machinery and those sounds of diversified industry that quicken the pulse of a Nation, and prolong the life of a Republic.

COTTON GOODS MANUFACTURED IN THE UNITED STATES DURING THE YEAR ENDING JUNE 1, 1860.

(This valuable Table was prepared expressly for this work from Official Returns, and has never before been published.)

States.	No. of Estab.	Capital Invested.	Pounds of Cotton used.	Value of Raw Material.	No. of Spindles	Looms.	No. of Hands. Male.	No. of Hands. Fem.	Annual Cost of Labor.	Value of Product in 1850.	Value in 1860.	Incr. per ct.	Yards of Cott'n Cloths	Pounds of Cott'n Y'rn & Thread	Pounds of Batting.	Yards of Print Cloths.
Maine	19	$6,018,325	23,733,165	$3,319,335	281,056	6,877	1,828	4,936	$1,368,888	$2,630,616	$6,235,623	140.8	60,377,000	481,873	200,000	3,000,000
New Hampshire	44	12,586,880	51,002,324	7,128,196	636,788	17,336	3,829	9,001	2,888,604	8,861,749	13,699,994	50.4	151,713,609	221,000	200,000	25,621,750
Vermont	8	271,200	1,447,250	181,030	17,600	362	157	222	78,468	280,300	357,450	27.5	4,030,000	576,000	95,000	2,100,000
Massachusetts	217	33,704,674	134,012,759	17,224,592	1,673,498	42,779	13,691	24,760	7,798,476	21,394,401	38,004,255	77.58	415,291,438	3,776,340	3,200,000	76,691,280
Rhode Island	153	10,052,200	41,614,797	5,799,223	814,554	17,315	6,353	7,724	2,847,804	6,495,972	12,151,191	87.05	147,652,300	5,072,114	306,240	79,734,837
Connecticut	129	6,627,000	31,891,011	4,028,406	435,466	8,675	4,028	4,974	1,743,480	4,122,952	8,911,387	116.14	78,161,000	2,282,250	1,557,000	24,539,515
Tot'l, N. E. States.	570	$69,260,279	283,701,306	$37,680,782	3,858,962	93,344	29,886	51,617	$16,725,720	$43,785,990	$79,359,900	81.24	857,225,347	12,409,527	5,648,240	211,687,382
New York	71	$5,366,179	23,945,627	$3,030,216	348,584	7,885	3,017	4,552	$1,380,252	5,019,323	6,611,528	31.72	68,157,121	1,715,480	2,466,466	40,144,418
Pennsylvania	188	9,208,440	37,496,203	7,396,888	476,979	12,994	6,431	8,580	2,774,400	5,812,126	13,673,439	135.25	114,395,986	9,739,181	2,072,500	14,025,200
New Jersey	42	1,316,550	9,094,649	1,242,610	123,548	1,567	982	1,490	459,892	1,289,648	2,952,688	121.20	12,593,610	4,121,742	678,050	6,000,000
Delaware	11	582,500	3,403,000	570,102	38,974	986	520	589	220,244	538,439	941,703	74.89	12,220,000	603,128	300,000	....
Maryland	20	2,254,500	12,880,119	1,698,413	51,835	1,670	1,093	1,594	576,780	2,021,396	2,973,877	42.16	20,356,031	33,120	182,000	....
Dist. of Col'mbia.	1	45,000	294,117	47,403	2,560	83	70	25	19,800	100,000	74,400	decr.	980,000	....	....	....
Tot'l, Midd. St'tes.	333	$18,773,569	87,113,715	$13,985,632	1,042,480	25,185	12,113	16,830	$5,431,408	$14,780,932	$27,227,635	84.2	228,702,748	16,212,651	5,699,016	60,169,618
Ohio	8	$265,000	3,192,500	$374,100	19,664	540	372	466	$151,164	$594,204	723,500	21.7	4,100,000	1,300,000	932,000	....
Indiana	2	251,000	1,813,944	229,925	11,000	375	177	190	84,888	86,660	344,350	......	3,800,303	....	166,600	....
Illinois	3	4,700	95,000	11,930	....	......	10	1	2,640	....	18,987	......	....	....	94,700	....
Missouri	2	169,000	990,000	110,000	5,000	80	85	85	30,600	142,900	230,000	......	1,000,000	500,000	90,000	....
Kentucky	6	244,000	1,826,000	214,755	6,192	76	130	116	41,280	445,639	315,270	decr.	71,350	1,439,600	298,000	....
Utah	1	6,000	12,000	6,000	70		4	3	3,420	....	10,000	......	....	10,000	....	....
Tot'l, West. St'tes.	22	$939,700	7,929,444	$946,710	43,926	1,071	778	861	$313,992	$1,269,403	$1,642,107	29.	8,971,653	3,249,600	1,581,000	
Arkansas	2	$37,000	187,500	$11,600	....	......	14	11	$4,428	17,300	23,000	......	100,000	....	....	....
Tennessee	30	965,000	4,072,710	384,548	29,850	243	323	576	139,180	508,481	698,122	37.29	1,981,400	2,801,968	14,400	....
Virginia	16	1,367,543	7,544,297	811,187	49,440	2,160	694	747	260,856	1,446,109	1,459,971	......	11,064,557	908,184	25,000	....
North Carolina	38	1,112,750	5,540,738	601,364	41,884	761	446	1,290	185,220	985,411	1,005,567	......	4,605,072	3,451,485	....	....
South Carolina	17	801,825	3,978,061	431,525	30,890	525	342	549	123,300	842,410	713,050	decr.	5,866,018	1,000,708	....	....
Georgia	33	2,126,103	13,907,904	1,466,375	85,186	2,041	1,131	1,682	415,332	1,395,056	2,371,207	69.97	17,850,034	4,594,480	....	....
Florida	1	30,000	200,000	23,600	1,600	20	40	25	7,872	49,920	40,000	decr.	149,000	120,000	....	....
Alabama	14	1,316,000	5,246,800	617,633	35,740	623	543	769	198,408	398,585	1,040,147	160.96	7,610,668	1,647,000	....	....
Louisiana	2	1,000,000	1,995,700	226,600	6,725	150	220	140	49,440	....	466,500	......	2,376,000	550,000	....	....
Mississippi	4	230,000	698,800	79,800	6,344	90	106	109	36,264	22,000	176,328	......	1,130,709	196,000	....	....
Texas	1	450,000	588,000	64,140	2,700	100	130		15,600	....	80,695	......	719,400	....	....	....
Tot'l, South. St'tes	158	$9,436,221	43,960,510	$4,718,372	290,359	6,713	3,980	5,898	$1,455,900	$5,665,362	$8,104,587	43.	58,352,058	15,369,82	39,400	
Aggregate	1,083	$98,409,769	422,704,975	$57,331,496	5,235,727	126,313	46,766	75,206	$23,907,920	$65,501,687	$116,334,229	77.6	1,148,252,406	47,241,603	12,967,956	271,857,000

WOOLEN GOODS PRODUCED IN THE UNITED STATES DURING THE YEAR ENDING JUNE 1, 1860.

[This valuable Table was prepared from official returns, and has never before been published.]

States.	No. of Estab-'me'ts.	Capital Invested.	Pounds of Wool used.	Pounds of Cot'n used in Satinets.	Cost of Raw Materials.	No. of Hands Employed. Male.	Fem.	Annual Cost of Labor.	Value of Product. 1850.	1860.	Per Cent. Incr'e.	Yards of Woolen Cloth.	Pounds of Yarn.	Pounds of Rolls.	Pairs of Blan-kets.	No. of Shawls.
Maine	63	$964,600	2,619,891	82,500	$1,091,272	593	555	$279,392	$1,022,929	$1,835,138	79.4	2,509,100	17,100	192,111	96,680	
New Hampshire	68	1,441,850	3,903,204	69,000	1,636,598	866	672	422,870	2,134,967	2,633,310	23.5	5,782,641	341,630	68,700	44,400	
Vermont	51	1,749,850	4,092,510	279,500	1,681,825	901	1,178	414,228	1,820,769	2,961,137	62.63	3,975,882	3 000	89,548		
Massachusetts	138	8,978,153	33,535,197	4,855,370	12,442,525	7,624	5,280	3,020,650	12,781,514	19,665,487	53 85	34,399,348	2,160,071	17,300	57,207	157,000
Rhode Island	57	3,168,500	6,832,600	3,056,200	4,070,224	2 593	1,636	1,069,176	2,504,700	6,916,205	176.8	19,343,000	112,500	....	....	100,000
Connecticut	84	2,491,000	7,179,819	1,472,505	4,043,124	2,308	1,459	949,020	4,974,959	6,840,220	37 49	14,301,043				
Total, N. Eng. States	461	$18,818,953	58,163,221	9,835,078	$24,965,568	14,883	10,780	$6,155,336	$25,244,838	$40,850,497	61.81	80,311,614	2,634,301	318,659	198,287	257,000
New York	195	3,211,256	7,738,884	193,688	3,564,911	2,588	1,719	1,014,803	7,605,774	6,049,017	Dec	7,951,679	....	280,000	6,000	230,000
Pennsylvania	309	4,395,410	7,309,494	4,337,000	4,485,805	3,804	2,355	1,425,540	5,792,566	8,279,218	42.9	23,405,469	2,988,650	176,255	42,347	110,200
New Jersey	35	583,400	1,175,800	239,500	548,678	532	303	203,126	1,020,941	1,085,104	....	1,754,575	179,600	....	8,325	19,200
Maryland	30	321,200	....	....	209,355	254	133	88,008	319,240	612,092	91.7	1,153,857	16,000	7,800	515	
Delaware	6	118,000	147,500	100,000	78,807	79	38	27,888	249,510	156,635	Dec.	427,200	35,000	7,500	250	
Total, Middle States	575	$8,629,265	16,371,278	4,870,183	$8,950,496	7,257	4,548	$2,759,375	$14,988,031	$16,182,066	8.0	34,692,780	3,219,850	471,525	57,437	359,400
Ohio	163	774,560	1,602,751	....	637,533	638	207	210,756	1,513,978	1,036,467	Dec.	1,078,266	234,806	406,350	5,760	
Indiana	120	526,441	1,333,696	....	458,099	506	100	171,240	528,700	801,621	51.6	680,355	153,525	389,686	5,910	
Illinois	50	263,350	576,600	....	193,002	181	35	59,596	370,870	295,480	Dec.	176,960	71,200	252,300	1,525	
Michigan	30	133,400	308,700	....	117,295	103	54	38,856	192,043	203,566	....	172,723	16,100	136,000	140	
Wisconsin	26	118,300	356,000	....	115,149	92	31	31,560	60,105	214,790	259.0	285,000	12,500	89,000		
Iowa	28	107,980	320,700	....	109,756	121	24	30,706	112,454	184,013	63.6	133,315	25,400	144,500	910	
Missouri	97	246,085	941,714	....	283,615	186	19	54,576	358,427	458,644	27.9	358,000	4,300	719,200	870	
Kentucky	118	512,595	2,218,050	170,700	750,935	614	87	144,456	803,507	1,164,761	44 9	2,230,246	7,925	761,950	885	
Total, Western States incl'ng one in Minn	633	$2,683,481	7,658,811	170,700	2,645,634	2,442	557	$741,806	$3,940,084	$4,357,842	10.6	5,114,865	525,755	2,899,686	15,500	
Virginia	108	523,570	1,476,520	10,000	496,194	457	115	123,660	826,746	859,749	....	1,007,714	21,000	329,210	1,500	
North Carolina	28	252,900	594,390	....	180,641	137	140	64,680	71,470	331,133	363.0	639,000	....	82,000		
South Carolina	10	60,800	303,800	....	75,920	50	55	13,440	15,100	100,062	562.0	300,000	....	49,175		
Georgia	30	263,400	1,088,530	142,500	286,767	192	217	68,592	....	500,261	....	1,435,000	....	79,000		
Alabama	16	151,500	348,635	5,000	115,570	109	103	87,596	21,800	234,949	977.0	613,410	....	84,000		
Louisiana	1	75,000	69,150	....	31,300	40	20	6,720	....	45,200	....	48,800				
Texas	10	73,000	171,150	18,000	50,230	51	7	12,120	22,000	75,796	244 0	94,976	....	86,250		
Mississippi	10	90,500	328,997	75,600	143,459	215	36	25,728	31,670	188,357	494.0	569,203	....	58,000	150	
Arkansas	11	38,000	125,500	....	30,240	22	5	5,340	8,800	45,476	416 0	....	....	125,000		
Tennessee	70	88,300	470,665	....	165,258	100	10	21,720	111,225	227,872	104.0	18,000	....	460,000		
Total, South'n States	294	$1,612,570	4,977,337	251,000	$1,581,579	1,373	708	$379,596	$1,108,811	$2,608,855	135.0	4,726,103	21,000	1,352,635	1,650	
Aggregate, incl'ing 4 mills, Pacific States	1,967	$31,900,939	88,804,319	15,270,061	$38,234,532	25,926	16,618	$10,087,773	$45,281,764	$64,243,260	41.3	124,897,862	6,401,206	5,061,405	314,874	616,400

STATISTICS OF THE PRODUCTION OF IRON IN THE UNITED STATES IN 1860, AND A LIST OF THE PRINCIPAL BLAST FURNACES AND ROLLING MILLS IN THE NEW ENGLAND, MIDDLE, AND WESTERN STATES.

[Since 1860 there has been a considerable increase both in the number of Blast Furnaces and Rolling Mills. Never was the trade in iron so active and prosperous as now, or its future more hopeful and brilliant. Europe has probably exhausted its capacity for the production of a superior quality of Iron, and the United States, from their inexhaustible resources, are destined to become the source of supply for the world. The ores and the coals of England are both inferior, and it is only by exercise of great skill, and subjection to numerous refining processes, that Iron of a tolerable quality is made. Germany and France have good iron ores, but are deficient in mineral coal, and when the forests cease to supply charcoal, the quality of their iron, inferior as it now is, will still further retrograde. Russia produces a good quality of Iron, but the sources of supply are so distant that it requires nearly two summers to reach a port of shipment. The war has secured to the iron-masters of the United States a protection more reliable and stable than any protective tariff, and they can now proceed to extend their operations with confidence of permanency; and when they have supplied the home demand, they will have acquired skill and advantages that will enable them to compete successfully with other nations in foreign markets.]

TOTAL NUMBER OF IRON WORKS IN THE UNITED STATES.

Anthracite Blast Furnaces	121	
Coke " "	24	
Raw Bituminous Coal Blast Furnaces	19	
Charcoal Blast Furnaces	416	
Total number of Blast Furnaces	—	580
Bloomaries		204
Forges		189
Rolling Mills		209
Total of all kinds running or in running order		1,192
Number of Double Puddling Furnaces in the Mills,		206
" Single " " "		1,064
Total number in the Rolling Mills	1,470	
Number in the Forges	34	
Total number in United States	—	1,504
Total number of Bloomary Fires		442
" " Refinery or Forge Fires proper		495
" " Nail Machines		2,645

Pig Iron produced in 1860	Tons, 884,474	Value, $19,487,790
Bar and other rolled Iron	" 406,298	" 22,248,796
Cast Iron		" 28,546,656
Steam Engines and Machinery		" 47,118,550
Coal, Anthracite	Tons, 9,398,332	Value, $11,874,574
" Bituminous	" 5,775,077	" 7,491,191
Aggregate	15,173,409	$19,365,765

A LIST OF THE ANTHRACITE AND CHARCOAL FURNACES AND ROLLING MILLS IN THE NEW ENGLAND, MIDDLE AND WESTERN STATES, IN 1860, WITH NAME OF OWNERS AND MANAGER, AND WHEN BUILT.

Anthracite Furnaces in New England.

Berkshire No. 1, 1853, Gay & Burt, West Stockbridge, Mass.
Berkshire No. 2, 1857, Gay & Burt, West Stockbridge, Mass.
Sharon, 1854, Hiram Weed & Co., Sharon Village, Conn.
Bull's Falls, 1844, D. & E. Wheeler, Kent Station, Conn.

Anthracite Furnaces in New York and New Jersey.

Port Henry No. 1, 1847, Port Henry Furnace Co., John H. Reed, Treas., Essex co.
Port Henry No. 2, 1854, Port Henry Furnace Co., John H. Reed, Treas., " "
Siscoe, 1856, 13x42, Westport, " "
Clinton, S. A. Munson, owner, near Utica, Oneida co.
Hudson 1 and 2, 1850, C. C. Alger, Hudson, N. Y.
Poughkeepsie No. 1, 1848, Beck & Kuhnhardt, Supt. A. Town, Poughkeepsie, "
Poughkeepsie No. 2, 1853, Beck & Kuhnhardt, Supt. A. Town, Poughkeepsie, N. Y.
Napanock, F. Bange, owner, Supt. M. S. Brinton, Napanock, Ulster co.
Croton, 1857, Nichols & Co., Supt. D. L. Merrit, Croton Landing, N.Y.
Peekskill, 1854, Warren Murdoch, Peekskill.
Greenwood Nos. 1 and 2, R. P. & P. P. Parrott, Orange co.
Manhattan, 1854, Headley, Leffarts & Co., Supt. M. Brock, Manhattanville.
Boonton, Fuller, Lord & Co., W. G. Lathrop, Supt., Boonton, N. J.

Anthracite Furnaces in Pennsylvania.

[For a description of some of the largest blast furnaces in Pennsylvania, see pp. 576-9.]

Cooper Nos. 1, 2, 3, see p. 577.
Durham No. 1, 1848, Cooper & Hewitt, near Easton.
Durham No. 2, 1851, Cooper & Hewitt, " "
South Easton, 1853, Charles Jackson, Jr., " "
Glendon Nos. 1, 2, 3, 1844, '45, and '50, Charles Jackson, Jr., owner, W. Firmstone Supt., " "
Allentown Nos. 1, 2, 3, 4, see p. 577, Allentown.
Lehigh Crane Co., see p. 576, near "
Thomas Iron Co., see p. 576, " "
Lehigh Valley, 1855, B. S. Levan, Supt., " "
Poco, 1855, Carbon Iron Co., Dennis Bowman, Pres., Parryville, Carbon co.
Mauch Chunk, 9x33, Weiss, Lippencott & Co., W. McDowell, manager, Mauch Chunk.
Pioneer, 1837, Atkins & Brother, Pottsville.
Leesport, 1853, F. S. Hunter., Agent, Supt. T. Cole, Leesport.
Moselem, 1823, F. S. Hunter, Supt. Nicholas Hunter, near Leesport, Berks co.
Robesonia No. 1, 1853, Robeson, White & Co., " "
Robesonia No. 2, 1858, Robeson, White & Co.. " "
Reading, 1854, Seyfert, McManus & Co., Reading, " "
Henry Clay No. 1, 1846, Eckert & Brother, Supt. D. E. Benson, Reading, Berks co.
Henry Clay No. 2, 1854, 15x38, Eckert & Brother, Supt. D. E. Benson, Reading, " "
Keystone, 1854, 12x45, Birdsborough, " "
Hopewell, 1857, Clingan & Buckley, Hopewell, " "
Phœnix, see p. 579.
Montgomery, 1854, Miller, Patterson & Hollingsworth, Port Kennedy, Montg. co.
Lucinda, 1856, Wm. Schall, Norrist'n, " "
Swede, Nos. 1 and 2, Joel B. Morehead, near Norristown, " "
Plymouth, 1845, Stephen Colwell, Plymouth, " "
Merion, 1848, Joel B. Morehead, " " "
Springmill, 1844, D. Reeves and others, Springmill, " "
William Penn No. 1, 1845, Hitner, Cresson & Co., near " " "
William Penn No. 2, 1853, Hitner, Cresson & Co., near " " "
Shamokin, 1842, H. Longenecker & Co. Shamokin, Northumberland co
Chulasky, 15x42, J. V. L. DeWitt, Supt. R. W. Richardson, " "
Franklin, 1846, David Reeves & Son, near Danville, Montour co.
Pennsylvania, see p. 579.
Columbia, 1840, J. P. & J. Grove, " "

Roaring Creek, 1840, E. Reynolds & Bro., Supt. Wm. Kase, Montour co.
Safe Harbor, 1848, Reeves, Abbott & Co., Supt. Wyatt W. Miller, near Columbia, Lancaster co.
Conestoga, 1853, C. Geiger, Lancaster, " "
Shawnee No. 1, 1844, A. & J. Wright, near Columbia, " "
Shawnee No. 2, 1853, A. & J. Wright, near Columbia, " "
Cordelia, 1848, Kauffman, Shaeffer & Co., Supt. C. S. Kauffman, near Columbia, " "
St. Charles, 1853, Clement B. Grubb, near Columbia, " "
Henry Clay, 1845, C. B. Penrose & Co., " " " "
Chickeswalungo, 1846, E. Haldeman & Co., " " " "
Eagle, 1854, Eagle, Beaver & Co., " " " "
Donegal, 1847, Eckert & Myers, " " " "
Marietta No. 1, 1849, Musselman & Watts, Marietta, " "
Marietta No. 2, 1850, Musselman & Watts, " " "
Middletown Nos. 1 and 2, Wood & Stirling, Supt. J. C. Boyle, Middletown, Dauphin co.
Cameron, 1856, Landis & Co., " " "
Harrisburg, 1845, David R. Porter, Supt. W. Keller, Dauphin co.
Paxton, 1855, McCormick & Co., near Harrisburg, " "
Union Deposit, 1854, Gingrich, Balsbaugh & Co. Supt. S. M. Krauser, " "
New Market, 1855, Light & Early, near Millerstown, Lebanon co.
Dudley, 1855, R. W. Coleman, " "
North Lebanon Nos. 1, 2 and 3, George Dawson Coleman, Supt. Charles B. Forney, " "
Cornwall Nos. 1 and 2, R. W. & W. Coleman, Supt B. Mooney, " "
Stanhope, 1835, Breitenbach & Sheetz, near Pinegrove, Schuylkill co.
Duncannon, 1853, Fisher, Morgan & Co., Perry co.
Lewistown, 1846, Etting, Graff & Co., Supt. Wm. Willis, Lewistown, Mifflin co.
Hope, 1810, J. Murray, near " " "
Bloom, 1847, McKelvy & Neal, Columbia co.
Irondale Nos. 1 and 2, 1844, Bloomsburg Iron Co., Charles R. Jackson, Jr., Supt., " "
Henry Clay, 1847, Samuel Bettle, " "
Williamsburg, 1845, M. McDowell, " "
Hunlach's Creek, 1854, William Koons, Luzerne co.
Lackawanna, see p. 578.
Union, 1854, Beaver, Geddes & Co., Union co
Margaretta, 1855, Bingham, McKinney & Co., Supt. Mr. Kremer, Lycoming co.
Mill Hall, 1830, Mill Hall Iron Co., Clinton co.

Anthracite Furnaces in Maryland.

Rough and Ready Nos. 1 and 2, 9x30, Joseph & George P. Whitaker, Havre-de-Grace.
South Baltimore, 10x33, Daniel M. Reese, Baltimore.
Ashland, 11x32, Ashland Iron Co., Supt. Richard Green, near Baltimore.
Oregon, 11x36, Ashland Iron Co., Supt. Richard Green, near "

Charcoal Furnaces in New England.

Katahdin, 1845, David Pingee, Piscataqua co., Maine.
Dorset, (old), Bennington co., Vt.
Conant, 1820, Brandon Carwheel Co., Supt. George W. Palmer, Brandon, "
Pittsford, 1824, Pittsford Iron Co., Supt. Mr. Granger, Rutland co., "
North Adams, 1845, North Adams Iron Co., Supt. J. E. Marshall, Berkshire co., Mass.
Cheshire, 1848, Cheshire Iron Co., Supt. E. W. Thayer, Berkshire co., "
Briggs, 1847, Samuel Smith, Lanesborough, Berkshire co., Mass.
Lenox, 1839, Lenox Iron Co., Supt. W. A. Phelps, Berkshire co., "
Richmond, 9x31, Richmond Iron Co., Supt. John H. Coffin, Berkshire co., "
Vandusenville, 1834, " " "
Mount Riga, 1845, Salisbury Iron Co., Litchfield county, Conn.
Beckley, 1847, John A. Beckley, Supt. John Dunmore, Litchfield co., Conn.
Forbes, 1832, Forbes Iron Co., " " "
Scovills, 1844, Scovills & Co., " " "
Buena Vista, 1847, Hunt, Lyman & Co., Supt. D. M. Hunt, Litchfield co., "
Cornwall, 1832, Supt. Samuel Scovill, " " "
Cornwall Bridge, 1833, W. Cornwall, " " "
Joiceville and Chapensville, Landon & Co., Chapensville, " " "
Weed's, 7x24, Hiram Weed, Sharon Village, " " "
Kent, 1846, Stewart, Hopkins & Co., Kent, " " "
Limerock, 1825, Canfield & Robbins, Salisbury, " " "
Sharon Valley, 8x34, H. Landon & Co., Sharon Valley, " " "
Macedonia, 1826, C. Edwards, " " "

Charcoal Furnaces in New York and New Jersey.

Copake, 1845, W. L. Pomeroy & Co., Copake, Duchess co., N. Y.
Benedict's, 1854, Benedict & Co, Millerton, Duchess co., "
North East, 1847, Mr. Dagon, Millerton, " " "
Amenia, 1825, Mr. Gridley, Amenia, " " "
White's Dover, 1846, William White, Dover Plains, " " "
Fishkill, —— Isaac White, Hopewell, " " "
Dover, 1835, L. S. Dutcher & Co., lessees, South Dover, " " "
Beekman's, 9x36, Stirling, Foster & Co., Poughkeepsie, " " "
Greenwood, 1811, R. P. & P. P. Parrott, Greeenwood, Orange co. "
Southfield, 1839, Peter Townsend & Co., Southfield, Orange co., "
Sterling No. 2, 1847, Peter Townsend & Co., Warwick " " "
Mount Hope, 1836, B. F. Woodruff, Fort Ann, Washington co., "
Brasher, 1835, Isaac W. Skinner, St. Lawrence co., "
Fullerville, 1846, Fuller & Peck, St. Lawrence co., "
Rossie, 1844, George Parish, Supt. C. L. Lum, St. Lawrence co., "
Taburg, 1832, E. B. Armstrong, Rome, Oneida co., "
Wolcott, 1846, Leavenworth, Hendrick & Co., Wayne co., "
Ontario, 1847, J. M. French & Co., " " "
Clinton, 1848, George B. Harris, Ontario, Wayne co.,
Adirondack, 1827, Adirondack Iron and Steel Co., Supt J. R. Thompson, Sanford Lake, N. Y.
Crown Point, 1845, E. S. Bouge, Essex co., "
Alpina, 1846, Z. H. Benton, Oxbow, Jefferson co., "
Redwood, 1857, S. C. Sardan, Redwood, Jefferson co., "
Wegatchie, 1846, A. P. Sterling, Antwerp, Jefferson co., "
Sterlingburg, 1846, A. P. Sterling, Jefferson co., "
Sterlingbush, 1848, James Sterling, Jefferson co., "
Sterlingville, 1857, James Sterling, Jefferson co., "
Constantia, 9x35, William A. Judson, Oswego co., "
Norwich No. 1, 1856, Reed, Haynes & Co., Norwich, Chenango co., "
Norwich No. 2, 1856, Andrews, Rider & Co., Chenango co., "
Renton's No. 1, 1854, James Quimby, Supt. Joseph Marteen, Newark, N. J.
Renton's No. 2, 1857, James Quimby, " "
Freedom, 1838, Peter M. Ryerson, near Pompton, Passaic co., "
Pompton, 1837, Wm. C. Vreeland, Pompton, " " "
Mellville, 1853, R. D. Wood, Millville, Cumberland co., "
Wawayanda, 1845, Oliver Ames & Son, Supt. J. A. Brown, Sussex co., "
Franklin, 1770, James H. Holdane, Prest., Franklin Village, "
Oxford, 1755, Charles Scranton & Co., Warren co., "

Charcoal Furnaces in Pennsylvania.

Lehigh, 1826, Levan & Balliott, N. Whitohall, Lehigh co.
Hampton, 1809, Frederick Sigmund, Sheimersville, " "
Maria, 1845, S. Balliott & Co., Carbon co.
Pennville, 1853, John Balliott, " "
Rockland, 1791, J. V. R. Hunter, Supt., J. N. Hunter, near Kutztown, Berks co.
Mount Laurel, 1836, W. H. Clymer & Co., near Reading, " "
Maiden Creek, 1854, George Merkle, " "
Mount Penn, 1827, Shalter & Kauffman, " "
Hampton, 1846, E. & G. Brooke, Birdsborough, " "
Joanna, 1794, Darling & Smith, " "
Mary Ann, 1797, Horace Trexler, " "
Oley, 1770, Murkells & Levan, " "
Hopewell, 1759, Clingan & Buckley, Hopewell, " "
Warwick, 1736, David Potts, Jr., Chester co.
Mount Hope, 1785, E. B. & A. B. Grubb, Supt., Wm. Boyd, Lancaster co.
Conowingo, 7½x30, J. M. Hopkins Buck, Lancaster co.
Chestnut Grove, 1830, Charles Wharton, Jr., Adams co.
Carlisle, 1815, Peter Ege, Cumberland co.
Pine Grove, 1770, Jay Cooke, " "
Big Pond, 1836, Schoch, Sons & Co., Supt., Isaac S. Matthew, " "
Caledonia, 1837, Thaddeus Stevens' Heirs, Supt., Henry Sloat, " "
Mont Alto, 1807, Holker Hughes, Franklin co.
Carrick, 1828, J. R. Brewster, Supt., Wm. Noonan, Fannettsburg, " "
Valley, 5½x28, J. Beaver, Supt., J. Polsgrove, Loudon, " "
Warren, 1833, R. Lewis & Co., lessees, " "
Colebrooke, 1745, Wm. Coleman, Lebanon co.
Cornwall, 1845, R. W. Coleman, " "
Manada, 1837, E. B. & C. B. Grubb, Supt., J. Care, Hanover, Dauphin co.
Georgianna, 1855, Dr. Lewis Heck, " "

York, 1830, J. B. Bair & Co., Colemanville, York co.
Margaretta, 1837, Himes & Hahn, " "
Penn, 1845, J. Penn Fincher, Columbia co.
Esther, 1836, S. B Diemer, " "
Shickshinny, 1846, D. B. Koons, Luzerne co.
Forest, 1846, Kaufman & Reber, Union co.
Berlin, 1827, Clement & Charles Brooke, Supt., J. Church, Union co.
Beaver, 1848, Middleswarth, Kerns & Co., Supt., J. C. Wilson, Snyder co.
Washington, 1811, C. & J. Fallon, Supt., Dr. Wm. Irwin, near Lockhaven, Clinton co.
Howard, 1830, John Irwin, Jr. & Co. " "
Hecla, 1826, Gregg & Irwin, Supt., J. Irwin Gregg, Bellefonte, Centre co.
Eagle, 1848, C. & J. Curtin, " "
Logan, 1800, Valentine & Thomas, " "
Centre, 1790, Thompson, McCoy & Co. " "
Juliana, 1835, John Adams, Supt., R. H. McCoy, " "
Martha, 1832, Irwin & Thompson, " "
Monroe, 1846, Gen. J. Irwin, Supt., G. W. Johnson, Huntingdon co.
Huntingdon, 1796, G. & J. Shoenberger, Supt., Hays Hamilton, " "
Pennsylvania, 1813, Lyon, Shorb & Co., " "
Rough and Ready, 1849, S. T. Watson & Co., " "
Greenwood, 1833, J. A. Wright, " "
Mill Creek, 1838, James Irwin and others, Supt., John C. Watson, " "
Edward, 1839, Hugh McNeal, lessee, Supt., James E. Foote, " "
Rockhill, 1830, R. B. Wegton, " "
Malinda, 1846, J. & A. Sheffler, Supt., Thomas E. Orbison, " "
Brookland, 1838, Juniata Iron Co., Mifflin co.
Matilda, 1838, J. Haldeman, " "
Bald Eagle, 1824, Lyon, Shorb & Co., Blair co.
Ætna, 1805, Isett, Keller & Co., " "
Buena Vista, 1847, Dr. Alexander Johnson, " "
Elizabeth, 1832, Martin Bell, " "
Blair, 1846, H. N. Burroughs, Supt., A. R. Stewart, " "
Allegheny, 1811, Elias Baker, " "
Bennington, 1849, R. M. Lemon, Supt., L. Lowry Moore, " "
Gaysport, 1856, Watson, White & Co., " "
Hollidaysburg, 1856, Gardner, Osterloh & Co., Supt., A. M. Lloyd, " "
Frankstown, 1836, Crawford & Higgens, " "
Gap, 1846, Musselman & Barnitz, " "
Juniata, 1857, Neff, Dean & Co., Williamsburg, " "
Springfield, 1815, D. Good & Co., Supt., H. McAllister, near Williamsburg, " "
Rebecca, 1819, E. H. Lytle, Supt., James Hemphill, " "
Bloomfield, 1846, J. W. Duncan, Supt., James Madard, " "
Sarah, 1847, D. C. McCormick, Supt., M. Simpson, " "
Lemnos, 1841, John King & Co., Supt., Jno. B. Castner, Hopewell, Bedford co.
Spring Hill, 1854, Oliphant & Wilson, Supt., J. K. Duncan, Fayette co.
Fairchance, 1796, F. H. Oliphant, " "
Union, 1796, Baldwin & Cheney, " "
Redstone, 1800, Worthington & Snyder, " "
Somerset, 1847, Hanna & Dyer, Somerset co.
Wellersburg, 1856, E. L. Parker, Prest., Supt., J. P. Agnew, " "
Johnstown, 1846, Rhey, Matthews & Co., Cambria co.
Mill Creek, 1856, Wood, Morrell & Co., " "
Ben's Creek, 1846, " " " " "
Old Cambria, 1854, " " " " "
Cambria, see p. —— " " " " "
Astonville, 1855, Wm. Thompson, Lycoming co.
Mansfield, 1854, Mansfield Iron Co., Tioga co.
Stewardson, 1851, Alex. Laughlin, Supt., Jos. Steele, Armstrong co.
Mahoning, 1845, J. A. Caldwell & Co., " "
Brady's Bend, 1840, M. P. Sawyer and others, four furnaces. " "
Bed Bank, 1842, Reynolds & Richie, " "
Buffalo No. 1, 1846, P. Gruff, & Co., Supt., Joseph C. King, " "
Buffalo No. 2, 1839, P. Gruff, & Co., Supt., Joseph C. King, " "
Pine Creek, 1846, Brown & Mosgrove, " "
America, 1846, John Jamieson, " "
California, 1852, Mathiot & Commings, Supt. Moses Collins, Westmoreland co.
Valley, 1855, L. C. Hall & Co., Supt. L. C. Hall, " "
Laurel Hill, 1846, John Graff, Supt., E. Hoover, " "
Conemaugh, 1847, Johnstown Iron Co., Supt., J. Rhey, " "
Indiana, 1842, Elias Baker, Indiana co.
Black Lick, 1846, Wood, Morrell & Co., " "
Pike, 1845, Hunter Orr, Clarion co.
St. Charles, 1844, Patrick Kerr, " "
Catfish, 1846, Alex. Miller, Supt., J. H. Kahl, " "
Black Fox, 1844, Jacob Painter and others, Supt., S. Barr, " "
Stapley, 1854, R. & C. Shippen, " "
Richmond, 1846, John Keating, " "
Prospect, 1845, Moore, Painter & Co., " "
Eagle, 1846, Reynolds & Kribbs, " "
Sligo, 1845, Lyon, Shorb & Co., " "
Madison, 1836, " " " " "
Monroe, 1845, W. B. Fetzer & Co., J. E. Clark, Agent, " "
Shippensville, 1832, Shippen & Black, Supt., Robert Montgomery, " "
Lucinda, 1833, Buchanan & Reynolds, Supt., C. A. Rankin, " "
Helen, 1845, Wilson & McKim, " "
Corsica, 1847, J. P. Brown, " "
Forest, 1853, William Cross & Son, Venango co.
Hemlock, 1845, F. & W. M. Faber, " "
Clinton, 1841, S. F. Plumer, Supt., William Hollis, " "
President, 1847, Arnold Plumer, " "

Rockland, 1832, E. W. & H. M. Davis, Supt., H. M. Davis, Venango co.
Bullion Run, 1843, Wm. Cross and others, “ “
Jane, 1838, William Cross & Son, “ “
Slab, 1834, Wattenan, Larimer & Co., “ “
Sandy, 1838, C. M. Reed, “ “
Reymilton, 1843, A. W. Raymond, “ “
Sharpsburg, 1847, James Pierce, Mercer co.
Sharon, 1846, James B. Curtis, Supt., J. U. Price, “ “
Middlesex, 1845, 10x38, “ “
Mazeppa, 1846, John J. Spearman & Co., “ “
Springfield, 1837, Pardon Sennett, Supt., William S. Scollard, Mercer co.
Tremont, 1848, Crawford & Co., “ “
Willieroy, 1854, Stewart & Foltz, Lawrence co.
Wampun Run, 1857, Childs, Richardson and others, Supt., William Steward, “ “
Sophia, 1853, Knapp, Wilkins & Co., “ “
Maple, 1843, M. S. Adams, Butler co.
Hickory, 1840, 8x28, “ “
Marion, 1848, Case & Co., Harrisville, “ “
Dudley, 1857, Reynolds & Richie, “ “
Winfield, 1848, D. R. Smith, “ “

Charcoal Furnaces in Maryland.

Principio, 8½x32, J. & G. P. Whitaker, Baltimore RR., 3 miles east of the Susquehanna.
Lagrange, 1836, Rogers & Sons, Harford co.
Sarah, 1851, P. A. & S. Small, Supt., A. P. McCombs, near Belair.
Harford, 1845, Richard Green, Supt., Wm. Carmell, near Perrymansville.
Locust Grove, 1844, Robert Howard, Supt., George R. Burroughs, Baltimore co.
Gunpowder, 1846, Robert Howard, Supt., John S. Hawes, “ “
Muirkirk, 1842, Wm. E. Coffin & Co., Supt., George Cary, Prince George's co.
Chesapeake Nos. 1 and 2, S. S. Lee & Co., Hugh Jenkins, lessee, Baltimore.
Cedar Point Nos. 1 and 2, Peter Mowel, Baltimore.
Maryland Nos. 1 and 2, H. W. Ellicott & Bro., “ “
Laurel, 1846, D. M. Reese, “ “
Cecelia, 1854, John Ahern, “ “
Elk Ridge, 1854, Supt., Jos. D. Pettit, Ann Arundel co.
Elba, 1847, James W. Tyson, Carroll co.
Catoctin Nos. 1 and 2, Jacob M. Kunkle, Frederick co.
Antietam, 1845, John Herine, Supt., Jacob Hewitt, Washington co.
Green Spring, 1848, J. D. Roman & Co., Supt., B. F. Roman, “ “

Charcoal Furnaces in Ohio.

Gallia, 1847, Bentley, Campbell & Co., Supt., Mr. Bentley, Gallia co.
Washington, 1852, J. Peters & Co., Supt., Wm. Colvin, Lawrence co.
Pioneer, 1856, Ormsby, Colvin & Reed, Supt., Wm. Colvin, “ “
Olive, 1847, Campbell, Peters and others, Supt., Wm. N. McGugin, “ “
Buckhorn, 1836, Seeley, Willard & Co., Supt., Boudinot Seeley, “ “
Mount Vernon, 1835, Campbell, Ellison & Co., Supt., Robert Scott, “ “
Oakridge, 1856, Stetson, Mitchel & Co., Supt., O. M. Mitchell, “ “
Centre, 1838, Robert B. Hamilton, Supt., S. McGugin, “ “
Pine Grove, 1831, Hamilton, Peebles & Coles. Supt., John F. Peebles, “ “
Hecla, 1835, Campbell, McCullough & Co., Supt., John Wilson, “ “
Lawrence, 1834, Culbertson, Means & Co. “ “
Etna, 1832, J. Ellison and others, Supt., J. Ellison, “ “
Vesuvius, 1834, Dempsey & Co., Supt., Washington Boyd, “ “
Ohio, 1850, Linton & Means, Supt., George B. Sparks, Scioto co.
Scioto, 1830, J. B. Robinson & Sons, Supt., Charles Gliddon, “ “
Harrison, 1853, Spellman & Ross, Supt., H. Spellman, “ “
Franklin, 1826, John F. & Oran B. Gould, Supt., Oran B. Gould, “ “
Junior, 1828, Gliddon, Murfin & Co., Supt., James Murfin, Jr., Scioto co
Empire, 1847, Gliddon, Murfin & Co., Supt., O. H. Gliddon, Jr., “ “
Howard, 1853, Campbell, Woodrow & Co., Supt., H. A. Webb, “ “
Clinton, 1832, Gliddon, Crawford & Co., Supt., S. S. Gliddon, “ “
Bloom, 1832, G. S. Williams & Co., “ “
Mahoning, 1845, A. & J. M. Crawford, Supt., Benj. Crowther, Mahoning co.
Falcon, 1856, ——— Howard, “ “
Phœnix, 1854, Lemuel Crawford, Supt., N. M. Jones, “ “
Eagle, 1854, Crawford & Murray, Supt., T. Pollock, “ “
Briar Hill, 1847, W. Richards, Supt., “ “
Meander, 1857, Smith, Porter & Co., Supt., Mr. Fuller, “ “
Volcano, 1855, Volcano Iron Co., Supt., Charles A. Crandell, Stark co.
Massillon, 1854, Massillon Iron Co., Supt., William Pollock, “ “
Tilden's, 1854, Dr. Tilden, Huron co.
Logan, 1855, Roberts & Co., Supt., F. Case, Hocking co.
Hocking, 1852, Peter Haydn, Prest., Supt., W. H. Haydn, “ “
Fivemile, 1855, Webster & Co., lessees, Supt., Wm. M. Bowen, “ “
Bigsand, 1854, Bartlett, Dannar & Co., Supt., S. J. Summinger, Vinton co.

Zaleski, 1858, Zaleski Iron Co., Supt., Mr. Walters, Vinton co.
Vinton, 1854, Means, Clark & Co., Supt., Cyrus Newkirk, " "
Hambden, 1854, Damarin, Tarr & Co., Supt., McKean, " "
Eagle, 1854, Bentley, Benner and others, Supt., William B. Dennis, " "
Cincinnati, 1854, Westfall, Dungan and others, Supt., J. B. Royer, Jackson co.
Iron Valley, 1853, Thompson, Lesley & Co., Supt., S. Churchill, " "
Latrobe, 1854, Bundy, Austin & Co., Supt., Drew Ricker, " "
Buckeye, 1853, Newkirk, Daniels & Co., Supt., Warren Murfin, " "
Keystone, 1848, E. B. Greene & Co., Supt., M. Churchill, Jackson co.
Young America, 1857, Powel, Oakes & Co., Supt., Peter Powel, " "
Diamond, 1856, Grattan, Hoffman & Co., Supt., Peter Cowell, " "
Madison, 1854, Peters, Terry & Co., Supt., Jacob Ricker, " "
Limestone, 1854, Newson, Evans & Co., Supt., Wm. J. Evans, " "
Jefferson, 1854, Jefferson Furnace Co., Supt., George W. Baker, " "
Jackson, 1837, Davis & Tracy, "
Monroe, 1855, McConnell, Bolles & Co., Supt., Mr. Gilbert, " "
Cambria, 1854, David Lewis & Co., Supt., D. T. Lewis, " "

Charcoal Furnaces in the North West.

Illinois, 10x35, C. Wolfe & Co., Supt., C. Henninger, Elizabethtown, Hardin co., Ills.
Martha, 1849, Saline Coal Co., Supt. Chas. Sellers, Elizabetht'n, " "
Richland, 1844, A. Downing & Co., Bloomfield, Green co., Ind.
Mishawaka, 1833, Mishawaka, St. Josephs co., "
Indiana, 1839, E. M. Bruce & Co., Supt., W. H. Watson, Vermilion co., "
Kalamazoo, 1857, W. Burtt & Son, Kalamazoo co., Mich.
Eureka, 1855, Eureka Iron Works, Wayne co., "
Detroit, 1858, Detroit Iron Co., Detroit, "
Lake Superior Iron Co., (new) " "
Peninsular Iron Co., (new) " "
Quincy, 1855, W. J. Briggs & Enos G. Berry, Branch co., "
Branch, 1854, N. B. Gale, lessee, Quincy, Branch co., Mich.
Pioneer, Nos. 1 and 2, 1858, Charles F. Harvey, Agt., Marquette, Marquette co., "
Northwestern, 1853, Northwestern Iron Co., Supt., F. Wilkes, Mayville, Dodge co., Wis.
Ironton, 1857, Jonas Tower, Ironton, Sauk co., "
Pilot Knob, 1849, John S. McCune, Prest., Supt., J. B. Bailey, Iron co., Mo.
Maramec, 1856, W. James, lessee, Crawford co., "
Iron Mountain, 3, James Harrison, Prest., Supt., John J. Scott, Francis co., Mo.
Franklin, 1846, Franklin Iron Co., Supt., T. W. Childs, Franklin co., "

Rolling Mills in New England.

Pembroke, Pembroke Iron Co., Supt., Lewis L. Wadsworth, Pembroke, Me.
Danvers, 1831, C. A. Smith, Danvers, Mass.
Bay State, 1847, Bay State Iron Co., Supt., Ralph Croker, South Boston, "
Norway, Norway Iron Works, Supt., Mr. Gogan, " " "
Weymouth, 1836, Weymouth Iron Co., East Weymouth "
East Bridgewater, 1836, Philips & Sheldon, Plymouth co., "
Bridgewater, 1785, Bridgewater Iron co., " " "
Russell & Co.'s, 1807, Nathaniel Russell & Co., Supt. N. Russell, " " "
Tremont, 1843, Tremont Iron Co., Supt., Andrew S. Nye, " " "
Weweantit, 1854, Lewis Kenney & Co., Supt., Lewis Kenney, " " "
Parker, Parker Iron Co., Supt., Mr. Boyd, " " "
Agawam, 1842, Agawam Nail Co., Supt., Samuel T. Tisdale, " " "
Old Colony, 1844, Crocker & Co., Bristol, " "
Gosnold, 1856, Gosnold Mill Co., Supt., Lemuel Kullock, New Bedford, Mass.
Mount Hope, 1857, Fairbanks & Field, Supt., J. C. Leonard, " "
Fall River, 1842, Richard Borden, Fall River, "
Quinsigamund, 1847, Quinsigamund Iron Co., Worcester co., "
American, American Horse Nail Co., Providence, R. I.
Providence, 1845, Providence Iron Co., O. A. Washburn, Agent, " "
Fairhaven, 1820, Israel Davey, Fairhaven, Vt.
Cold Spring, 1846, J. M. Huntingdon & Co., Supt., J. Mitchell, near Norwich, Conn.
Ripley, 1847, Philip Ripley, Supt., G. Nock, Hartford co., "
Birmingham, Birmingham Iron and Steel Co., Supt., Mr. Hawkins, New Haven, " "
Stillwater, 1835, Stillwater Iron Co., Supt., Mr. Wicks, Fairfield co., "
Greenwich, 1836, Holden & Co., Supt., Mr. Hicks, " " "

Rolling Mills in New York.

Rensselaer, 1847, see p. 635, Rensselaer Iron Co., Troy, Rensselaer co.
Burden's, see p. 633, Henry Burden's Sons, Troy, Rensselaer co.
Albany, see p. 361, Corning, Winslow & Co., Troy, Rensselaer co.,
Buffalo, 1847, Buffalo, Erie co.
Jefferson, 1847, Hiram McCollom, Carthage, Jefferson co.
Sable, 1834, J. & J. Rogers, Essex co.
Boquet, 1838, William D. Ross's heirs, Essex Village, " "
Eagle, 1849, E. & J. D. Kingsland & Co., Keesville, Clinton co.
Peru, ——, Saltus & Company, Supt. William Partridge, " "
Ulster, 1825, J. & L. Tuckerman, Supt. John Simmons, Saugerties, Ulster co.
Suffern's, 1849, Andrew Winter, Ramapo, Rockland co.
Ramapo, 1800, Henry L. Pierson, J. Wilson, lessee, " "
Richardson, 1853, Charles Richardson, Auburn, Cayuga co.

Rolling Mills in New Jersey.

Boonton, 1825, Fuller, Lord & Co., Boonton, " "
Pompton, 1838, Charles A. Richter, near Rockaway, Morris co.
Powerville, 1846, T. C. Willis, " " "
Rockaway, 1855, Rockaway Iron Co., " " "
Dover, 1838, Henry McFarland, Supt., G. H. Hinchman, " "
Trenton, 1845, Cooper, Hewitt & Co., South Trenton, Mercer co.
Chrisman & Co., 1852, Chrisman & Co., near Jersey City, Hudson co.
Chrisman & Durben's, 1857, Chrisman & Durben, Jersey City, " "
Charlottenburg, 1840, Geo. H. Renton,
Cumberland, 1824, Cumberland Iron Co., Supt., Robert C. Nichols, Bridgeton.

Rolling Mills in Pennsylvania.

Kensington, 1840, Nat. Rowland & Co., Philadelphia.
Kensington Iron Works, 1845, James Rowland & Co., "
Penn. 1845, Verree & Mitchell lessees, "
Fountain Green, 1848, Strickland Kneass, Supt., H. McCarty, Jr., "
Oxford, 1855, W. & H. Rowland, "
Treaty, 1846, Leibert & Wainright, "
Fairmount, 1846, Morris, Tasker & Co., "
Grey's Ferry, 1858, M. B. Buckley & Son, "
Pencoyd, 1855, A. & P. Roberts, Flat Rock, Montgomery co.
Cheltenham, 1790, Rowland & Hunt, Milltown, Montgomery co.
Schuylkill, 1858, Alan Wood and others, near Conshohocken, Montgomery co.
White Marsh, 1857, Wood & Lukens, " "
Pennsylvania, 1853, John Wood & Brothers, " "
Norristown No. 1, 1850, Wm. Schall, " "
Norristown Nail Factory, No. 2, Schall & Dewees, " "
Norristown No. 3, 1846, James Hooven, " "
Conshohocken, 1832, John Wood & Brothers, near Conshohocken, " "
Phœnix, 1846, Phœnix Iron Co., Phœnixville, " "
Thorndale, 1847, Horace A. Beale, Chester co.
Rokeby, 1795, Abigail Fisher, Supt. J. G. Fisler, near Coatesville, " "
Brandywine, 1810, Lukens' heirs, " " "
West Brandywine, 1840, Samuel Hatfield, Supt. Benj. R. Hatfield, Chester co.
Laurel, 1856, Hugh E. Steele, " "
Valley, 1837, C. E. Pennock & Co., " "
Viaduct, 1838, Steele & Worth, " "
Hibernia, 1833, Charles Brooke, " "
Pleasant Garden, 1845, D. McConkey, Supt. J. Scott, " "
Pine Grove, 1844, Enos Pennock, Lower Oxford, " "
Pottsgrove, 1846, Potts & Bailey, Pottstown.
Pine, 1845, Joseph Bailey & Sons, Douglasville, Berks co.
Birdsborough, 1848, E. & G. Brooke, near Reading, " "
Gibraltar, 1846, H. A. & S. Seyfert, near Reading, " "
Reading, 1836, Seyfert, McManus & Co., Reading, " "
Neversink, 1845, M. A. & S. Bertolet & Co., Reading, " "
McIlvaine's, 1857, Wm. M. McIlvaine, " "
Keystone, 1857, Snell, Mullen, Banford & Co., Reading, " "
Pottsville, 1852, John Burnish & Co., Pottsville.
Palo Alto, 1855, Haywood, Lee & Co., "
Allentown, (new) Allentown, Lehigh co.
Bethlehem, (new) Bethlehem, " "
Weissport, 1854, Weiss & Wentz, Weissport, " "

Lackawanna, 1844, Lackawanna Iron Co., Scranton, Luzerne co.
Danville, 1845, S. P. Case, Danville, Montour co.
Rough and Ready, 1847, Hancock & Foley, near Danville, " "
Pennsylvania (late Montour), Waterman & Beaver, Danville, " "
Duncannon, 1838, Fisher, Morgan & Co., Supt. John Wister, Duncannon, Perry co.
Fairview, 1847, J. Pratt & Son, Supt. Charles Wilbar, Fairview, Cumberland co.
Central, 1853, Charles L. Bailey & Bros., Harrisburg, Dauphin co.
Safe Harbor, 1848, Reeves, Abbott & Co., Supt. Wyatt W. Miller, Safe Harbor, Lancaster co.
Columbia, 1854, Smith & Bruner, Supt. James A. Richards, Columbia, " "
Colemanville, 1828, George Dawson Coleman, Supt. M. Hoopes, Colemansville, " "
Heshbon, 1842, William McKinney, Williamsport, Lycoming co.
Crescent, 1842, H. D. Heelman & Co., " "
Blossburg, 1850, J. H. Gulick, Blossburg, Tioga co.
Howard, 1840, John Irwin, Jr., & Co., near Bellefoute, Centre co.
Heckla, 1846, Gregg, Irwin & Co., Hublersburg, " "
Milesburg, 1849, Irwin, McCoy & Co., near Bellefonte, " "
Eagle, 1831, C. & J. Curtin, near Bellefonte, " "
Bellefonte, 1825, Valentines, Thomas & Co., Bellefonte, " "
Portage, 1839, Burroughs & Higgens, & Co., Supt. Joseph Higgens, Duncansville, Blair co.
Juniata, 1838, S. Hatfield, Jr., Alexandria, Huntingdon co.
Mont Alto, 1832, Holker Hughs, Mont Alto, Franklin co.
Lehigh, 1837, Stewart & Co., South Easton, Northampton co.
Cambria, 1857, Cambria Iron Works, Johnstown, Cambria co
Fairchance, 1834, F. H. Oliphant, Supt. G. W. Paul, Uniontown, Fayette co

McKeesport, 1851, Wood, Morehead & Co., McKeesport, Allegheny co.
American, 1853, Jones, Lauth & Co., near Birmingham, " "
Western Tack, 1854, Chess, Wilson & Co., Supt. David Chess, near Birmingham, " "
Hecla, 1841, J. & W. McKnight, Birmingham, " "
Birmingham, 1857, Porter, Rolph & Swett, Birmingham, " "
Sligo, 1825, Lyon, Shorb & Co., Supt. F. Wernet, Pittsburgh, " "
Clinton, 1845, Graff, Burnet & Co., Supt. Mr. Marshall, Pittsburgh, " "
Pittsburgh, 1837, Zug & Painter, Pittsburgh, " "
Sheffield, 1848, Singer, Hartman & Co., " "
Eagle, 1850, James Wood & Co., Supt. G. Wittengill, " "
Pennsylvania, 1844, Everson, Preston & Co., " "
Kensington, 1845, Miller, Lloyd & Black, Supt. Mr. Nickson, Pittsburgh, " "
Pittsburgh Steel Works, 1835, Isaac Jones, Pittsburgh, " "
Wayne, 1829, Bailey, Brown & Co., Pittsburgh, " "
Sable, 1830, Zug & Painter, " " "
Juniata, 1826, Dr. P. Shoenberger, Supts. Crawford & Prother, Pittsburgh, " "
Duquesne, 1846, Coleman, Heilman & Co., Supt. William Varnum, Pittsburgh, " "
Lorenz, 1856, Lorenz, Stewart & Co., Pittsburgh, " "
Etna, 1828, Spang & Co., Supt. A. G. Lloyd, near Pittsburgh, " "
Vesuvius, 1845, Lewis, Dalzell & Co., Pittsburgh, " "
Brady's Bend, 1841, Brady's Bend Iron Co., Supt. D. Dudley, Brady's Bend, Armstrong co
Kittanning, 1848, Colwell, Brown & Floyd, Kittanning, " "
Sharon, ——, Sharon Iron Co., Supt. J. Barber, Sharon, Lawrence co.
Orizaba, 1847, McCormick's Trustees, Supt. Mr. Beehore, Newcastle, " "
Cosalo, 1840, Crawford Brothers, Supt, H. J. Evans, Newcastle, " "

Rolling Mills in Delaware and Maryland.

Wilmington, 1845, Gibbons & Hilles, Wilmington, Newcastle co., Del.
Diamond, 1854, McDaniel, Craige & Co., Wilmington, Newcastle co., "
Delaware, 1812, Alan Wood, near Wilmington, "
Marshall's, 1836, C. & J. Marshall, Newport, "
Elk, 1810, Parke, Smith & Co., Elkton, Md.

West Amwell, 1854, E. A. Harvey, Supt. Geo. Harlan, near Elkton, Md.
Northeast, 1847, McCullough & Co., Supt. Mr. Scott, Northeast, Cecil co., "
Shannon, 1857, McCullough & Co., Supt. Mr. Scott, near Northeast, Cecil co., "
Octarara, ——, McCullough & Co., Supt. Jethro J. McCullough, Rowlandsville, Md.

Joppa, 1851, Edward Patterson & Sons,
Supt. S. S. Patterson, Gunpowder, Md.
Baltimore Spike Mill, J. Hopkinson Smith,
Baltimore, "
Canton, 1851, H. Abbott & Son, do. "
Baltimore Forge, 1856, Fagely,
Heird & Co., Baltimore, "
Avalon, 1854, Joseph C Manning &
Co., Supt. Elijah Spurrier, Relay House, Md.
Antietam, 1831, J. Hewitt, Sharpsburg, "
Mount Savage, 1839, Mount Savage Iron
Co., Supt. Samuel Danks, Cumberland, "

Rolling Mills in Ohio.

Mahoning, —— Brown, Bonnell & Co.,
Supt. James H. Brown,
Youngstown, Mahoning co.
Falcon, 1842, James Ward & Co.,
Nilestown, Trumbull co.
Railroad, 1856, Railroad Iron Co.,
Supt. A. G. Smith, Cleveland, Cuyahoga co.
Newburg, 1857, Chillon & Jones,
Newburg, Cuyahoga co.
Zanesville, 1847, Campbell, Peters & Co.,
Supts. Baird & Davis, Zanesville.
Columbus, 1846, Peter Haydn,
Supt. D. Serles, Columbus, Franklin co.
Jefferson, 1852, Frazer, Kilgore & Co.,
Supt. F. S. Griesemer, Steubenville.

Rolling Mills on the Ohio River.

Missouri, 1854, James M. Tod & Co.,
Wheeling, Ohio co., Va.
Eagle, ——, E. C. Dewey,
Supt. John Hartman, " " " "
La Belle, 1852, Bailey, Woodward
& Co., Supt. William Bailey,
Wheeling, Ohio co., "
Crescent, ——, Crescent Iron Co.,
Wheeling, Ohio co., "
Belmont, ——, Norton, Acheson & Co.,
Supt. T. D. & G. W. Norton, Wheeling, "
Washington, 1853, Drakely & Fenton,
Supt. D. Darragh, Wheeling, "
Virginia, 1852, A. Wilson Kelley,
Supt. William Taylor,
near Wheeling, Ohio co., "
Ironton, 1852, H. Campbell & Co.,
Supt. Mr. Beason,
Ironton, Lawrence co., Ohio.
Star, 1855, Peters, James & Co.,
Supts. W. H. Powell and T. Pugh,
Lawrence co., "
Lawrence, 1853, James Rogers & Co.,
Supt. W. H. Powell,
Ironton, Lawrence co., "
Hanging Rock, 1854, Hempstead & Ohio.
Johnson, Lawrence co., "
Blandy, ——, Sturgess & Blandy,
Lawrence co., "
Franklin, 1855, James Murfin & Co.,
Supt. James Evans,
Portsmouth, Scioto co., Ohio.
Bloom Forge, 1856, Gaylord & Co.,
Portsmouth, Scioto co. "
Pomeroy, ——, Horton, Jennings & Co.,
Pomeroy, Meigs co., Ohio.
Cincinnati, 1847, Shreve, Steele & Co.,
Cincinnati, "
Globe, ——, Worthington & Co., " "
McNickle, 1830, J. K. McNickle's
heirs, Supt. E. W. Stephens, Covington, Ky.
Licking, 1848, Philips & Jordan,
Supt. Richard Jordan, " "
Swift's, 1854, Alexander Swift & Co.
Supt. Henry Westwood, Newport, Ky.
Newport, ——, D. Wolf,
Supt. P. Breith, " "
Louisville, 1851, T. C. Coleman & Co.,
Supt. J. Dangerfield, Louisville, "
Southern, 1855, Terrell, Clarke & Co.,
Supts. J. H. & B. Jones, Paducah, "

Rolling Mills of the Northwest.

Laclede, Chouteau, Harrison & Valle,
Supt. Mr. Mulligan, St. Louis, Mo.
Raynor's, 1858, N. Raynor &
Co., Supt. Moore Hardaway, " "
Missouri, 1854, McFall & Kelly,
Supt. Michael Lynch, " "
Pacific, 1856, James S. Stewart
& Co., Supt. Wm. Perry, " "
Allen, 1855, Thompson, White &
Co., Supt. Michael Corcoran, St. Louis, Mo.
Wyandotte, 1855, J. Holmes, Prest.,
W. H Zabriskie, Agent, Wyandotte, Mich.
Chicago, E. B. Wood, Supt. T. C. Smith,
Chicago, Ills.
Indianapolis, 1857, R. A. Douglas,
Supt. John Thomas, Indianapolis, Ind.

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